THE Journal OF THE AMERICAN DENTAL ASSOCIATION

JUNE
1957

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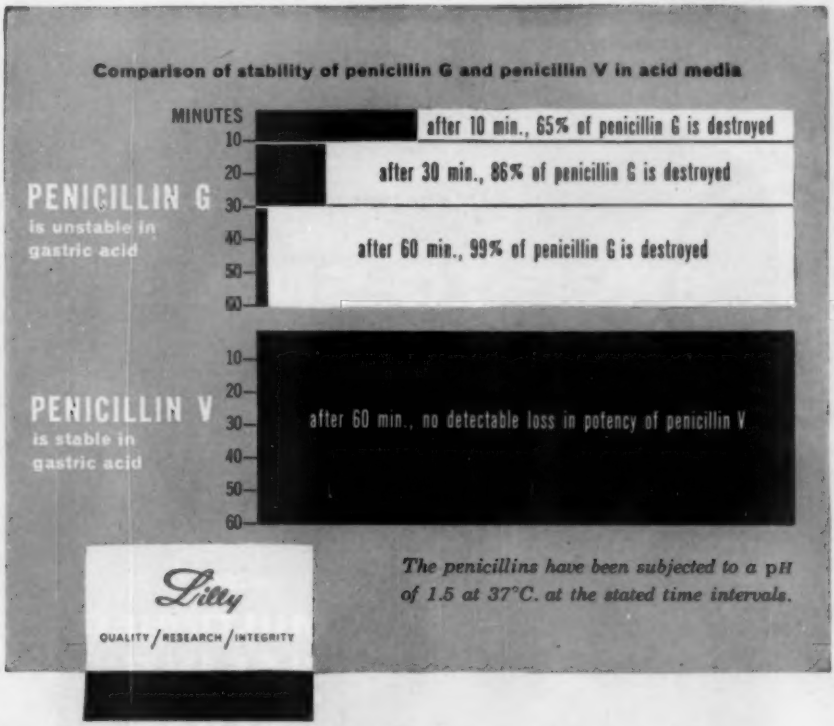
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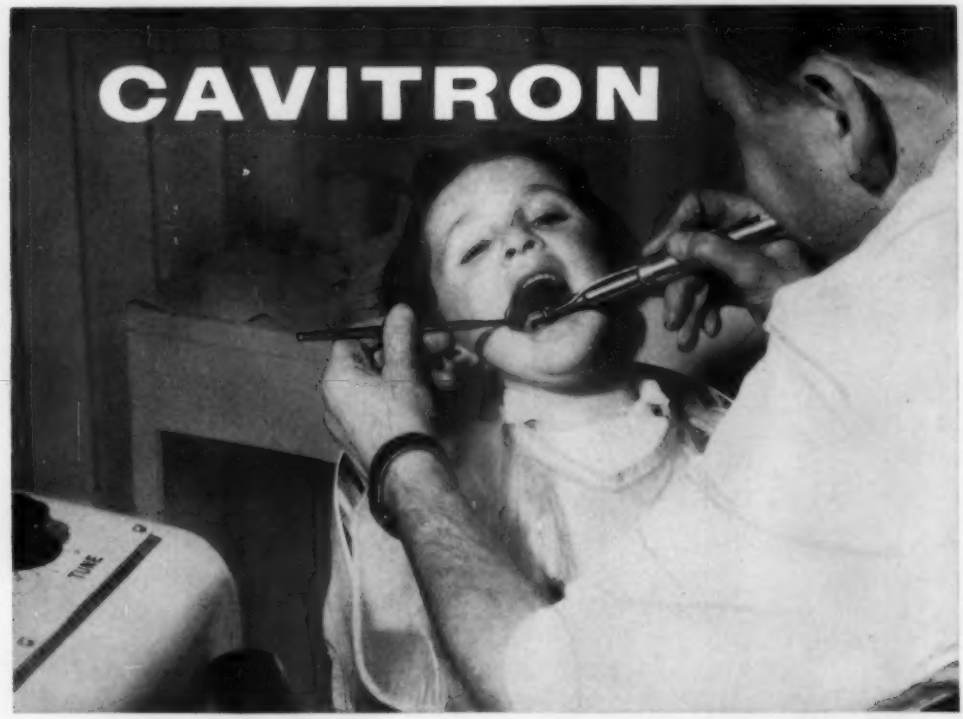

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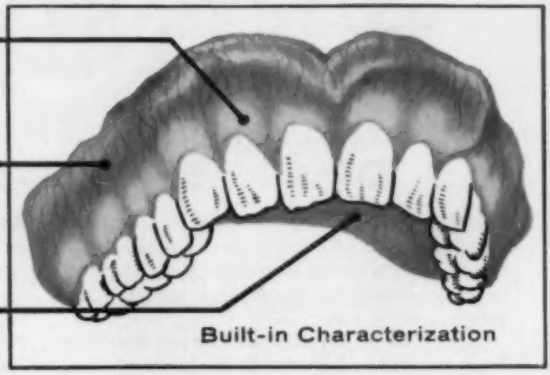

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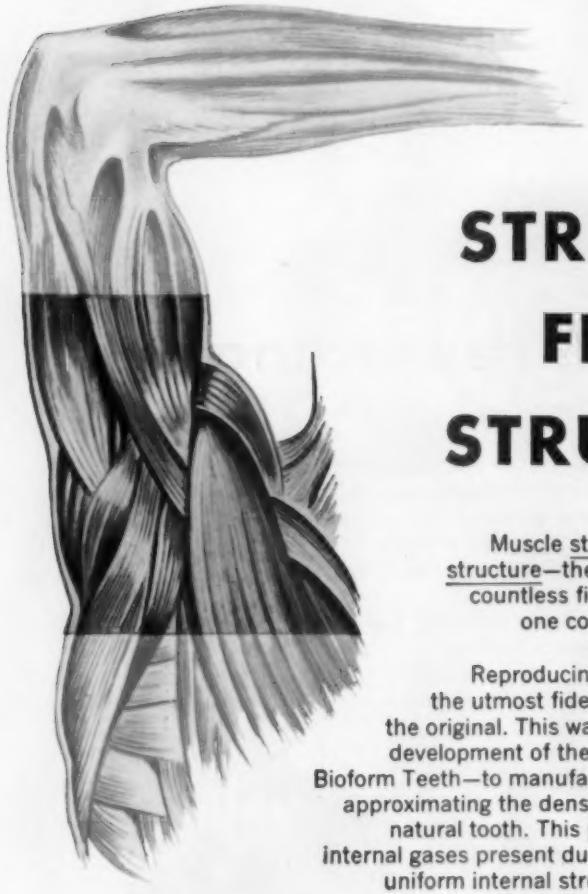

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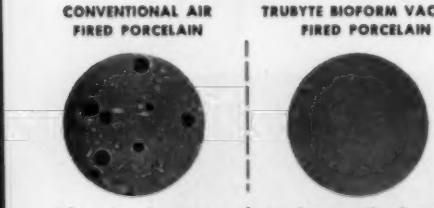

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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

VOLUME 54 • NUMBER 6

Changes in agar-agar type duplicating material and agar-agar on heating and storage

Peter M. Margetis, D.D.S., M.S., and*
William C. Hansen,† B.S., Washington, D. C.

Although extensive data have been published on the physical properties of agar-agar type oral impression materials, there is a shortage of published data on the physical properties of the reversible agar-agar type duplicating compounds. Although it may be true that the composition of these two materials differs primarily in water content, their uses are quite different.

It is the general practice today, when making an oral impression with reversible hydrocolloid material, to discard the material after it has been used once. The reversible duplicating compound, on the other hand, is reused and is repeatedly cycled between the gel and sol state, and stored at elevated temperatures for periods of time. When the desirable properties have degenerated, the material is discarded. For this reason the problem of deterioration is of considerable importance.

The object of these experiments was to observe and define more clearly the effect of heating and storage on some of the properties of the agar-agar type duplicating compound. The properties measured in these experiments were pH, viscosity, and crushing time under a constant load.

PROCEDURE

Samples of agar-agar type duplicating compound and powdered agar-agar (USP) were procured commercially for these experiments. Specimens of the duplicating compound were prepared in the

This work is a part of the dental research program conducted at the National Bureau of Standards in cooperation with the Council on Dental Research of the American Dental Association, the Army Dental Corps, the Air Force Dental Service, the Navy Dental Corps and the Veterans Administration.

The data in this paper were presented in a thesis submitted by Peter M. Margetis in partial fulfillment of the requirements of the Graduate School, Georgetown University, Washington, D. C., for the degree of Master of Science.

The authors wish to express their appreciation to Dr. Aaron S. Posner and Dr. Florence H. Forziati of the National Bureau of Standards for the roentgen ray diffraction patterns and the infrared absorption spectra, respectively.

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†Physicist, dental research section, National Bureau of Standards.

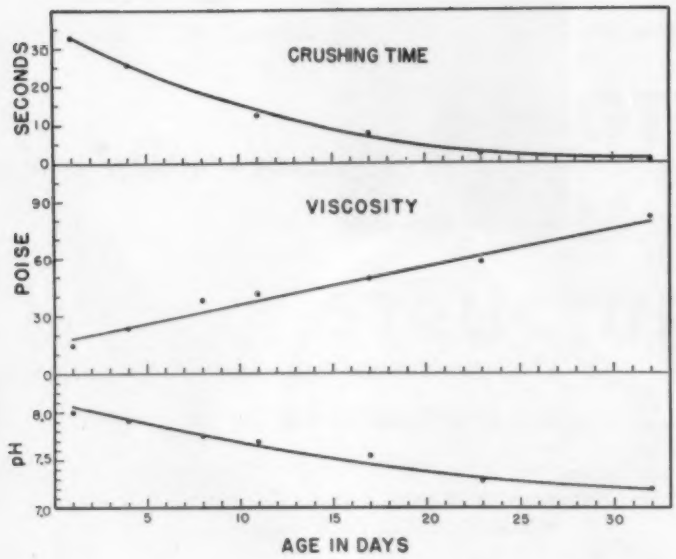

Fig. 1 • Crushing time, viscosity and pH as a function of time stored of one specimen of commercial agar-agar type duplicating compound stored at 52°C.

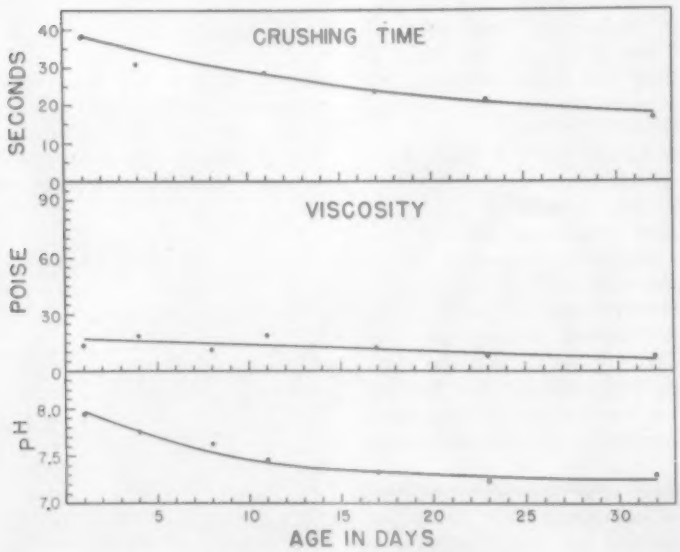

Fig. 2 • Crushing time, viscosity and pH as a function of time of reboiled commercial agar-agar type duplication compound

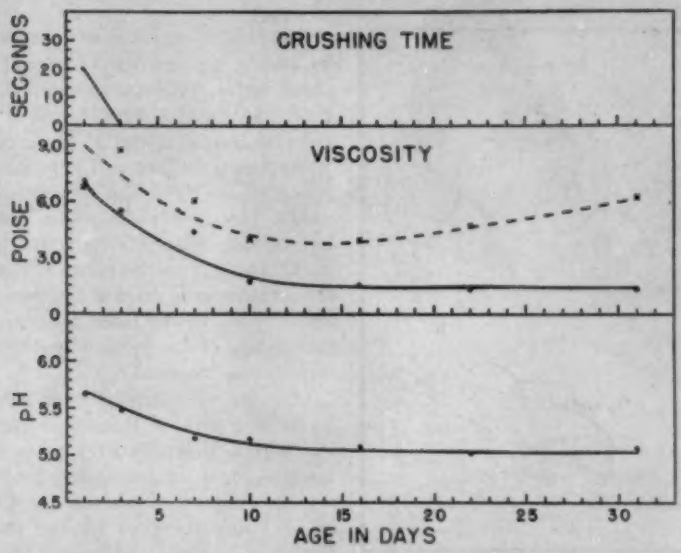

Fig. 3 • Crushing time, viscosity and pH as a function of time stored of 5 per cent agar-agar

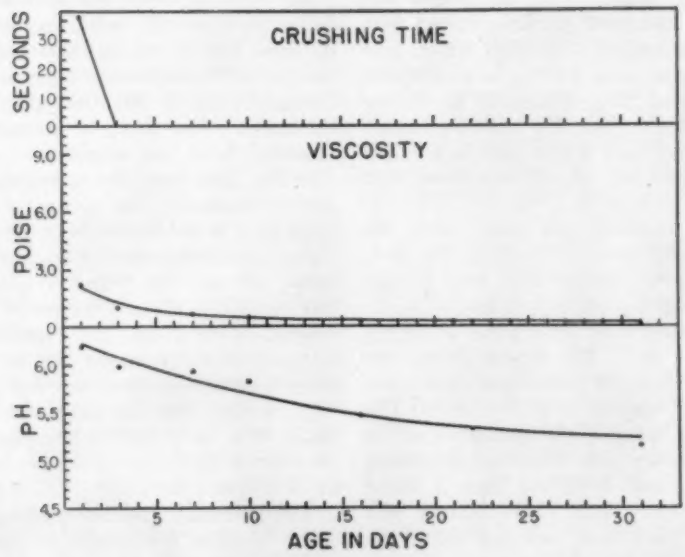

Fig. 4 • Crushing time, viscosity and pH as a function of time of reboiled 5 per cent agar-agar

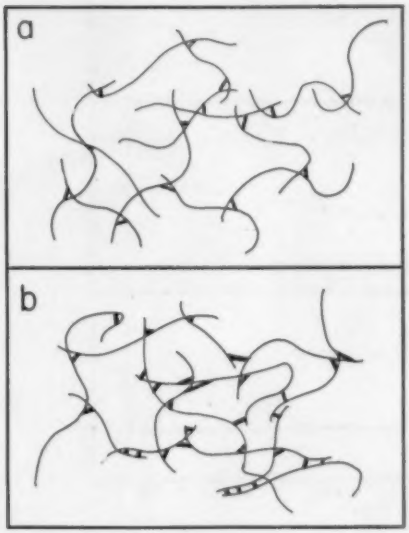

Fig. 5 • Hydrogen bonding between agar molecules in the early stages, a, and late stages, b, of storage

following manner: the compound was ground into small particles, mixed with an equal weight of distilled water, at a temperature near 100°C., in a container which was then immersed in boiling water for one hour. The resulting suspension was poured into mason jars, sealed and immediately placed in a water bath which was kept at 52°C.

Four separate runs were made. In three of the runs (1, 3 and 4) the specimens were divided into two groups. One group was allowed to remain in the 52°C. water bath for periods extending up to 32 days. The second group was removed from the water bath each afternoon and allowed to gel overnight. The following morning the specimens of this second group were immersed in boiling water for one hour and then replaced in the water bath. This heating and gelation cycle was repeated daily, exclusive of week-ends, for periods extending up to 32 days.

Samples of agar-agar were prepared by adding the powdered material to distilled water. A concentration of 3 per cent was used in runs 1 and 3 and 5 per cent in runs 2 and 4. These mixtures were placed in jars and kept in boiling water for one hour and then poured into mason jars and sealed. The jars were immediately placed in a water bath at 52°C. In three of the runs (1, 3 and 4), the samples were divided into two groups and treated in the same manner as the two groups of commercial agar-agar type duplicating material.

Changes in viscosity were measured, at 52°C., with a Brookfield rotational viscometer. Readings were taken at four rates of shear, corresponding to 2, 4, 10 and 20 revolutions per minute. Changes in pH were recorded by the use of a Beckman model G pH meter equipped with external electrodes. By the use of the external electrodes, it was possible to measure the pH of the specimens while they were immersed in the constant temperature bath.

All data for both pH and viscosity were taken on the same specimens at different ages. Crushing time was measured with a compression tester under a constant load of 300 Gm. per square centimeter. The time, in seconds, was recorded from the application of the 300 Gm. load until the specimen completely fractured. The groups of specimens were stored overnight in the 52°C. water bath before the first readings were made. Hence, the reboiled specimens had been reboiled once before the initial readings were made. (By "reboiled" it is meant that the mason jars were immersed in boiling water for one hour.) All crushing time measurements were made in a room with a constant temperature of 22°C. and a relative humidity of 55 per cent.

The specimens for the crushing time tests, cylinders 0.5 inches in diameter and 0.75 inches in length, were prepared according to the method described in

Table 1 • pH and viscosity of duplicating material stored at 52°C.

Run	Age in days	No. of spec.	pH	Viscosity in poise			
				2 rpm	4 rpm	10 rpm	20 rpm
1	1	3	8.07 ± 0.01	122 ± 4	72.7 ± 0.8	40.3 ± 0.2	25.8 ± 0.2
	3	3	8.17 ± 0.08	192 ± 12	113 ± 8	63.4 ± 3.7	41.1 ± 2.2
	6	3	8.03 ± 0.02	271 ± 9	166 ± 6	90.2 ± 2.8	62.3 ± 1.1
	10	3	7.81 ± 0.05	374 ± 9	218 ± 6	126 ± 4	76.8 ± 4.1
2	1	5	8.08 ± 0.03	44.8 ± 2.2	26.7 ± 1.2	14.9 ± 0.8	9.78 ± 0.57
	4	5	7.80 ± 0.07	50.3 ± 1.1	30.6 ± 0.5	17.2 ± 0.5	11.6 ± 0.2
	7	5	7.79 ± 0.08	70.2 ± 2.0	43.3 ± 1.1	24.1 ± 0.7	15.9 ± 0.5
	10	5	7.72 ± 0.07	83.2 ± 3.3	51.6 ± 2.0	28.8 ± 1.0	19.4 ± 1.5
	14	5	7.77 ± 0.04	110 ± 6	66.8 ± 3.1	36.2 ± 1.4	25.5 ± 0.9
3	1	2	8.17 ± 0.01	35.6 ± 1.6	23.2 ± 1.3	13.7 ± 0.9	9.69 ± 0.63
	4	2	8.00 ± 0.00	64.8 ± 3.4	40.5 ± 1.6	22.5 ± 0.8	15.0 ± 0.3
	11	2	7.88 ± 0.01	245 ± 15	145 ± 6	76.4 ± 2.0	47.9 ± 0.5
	18	2	7.57 ± 0.00	484 ± 14	280 ± 8	142 ± 6	88.2 ± 2.5
4	1	3	8.00 ± 0.02	74 ± 3	43 ± 1	23.7 ± 0.5	15.6 ± 0.5
	4	3	7.92 ± 0.02	122 ± 12	75 ± 8	41.1 ± 4.5	26.4 ± 2.9
	8	3	7.75 ± 0.02	224 ± 26	137 ± 17	73.9 ± 9.4	47.3 ± 5.5
	11	3	7.72 ± 0.02	282 ± 57	173 ± 26	89.5 ± 18.0	56.7 ± 10.9
	17	3	7.56 ± 0.01	422 ± 108	249 ± 65	128 ± 33	79.0 ± 19.7
	23	3	7.30 ± 0.03	647 ± 211	372 ± 124	187 ± 65	116 ± 38
	32	3	7.20 ± 0.03	814 ± 232	507 ± 164	267 ± 91	162 ± 54

the American Dental Association Specification No. 11. They were allowed to gel in air at room temperature for 30 minutes and were then removed and placed in a beaker of distilled water at room temperature where they remained for another 30 minutes before being tested.

RESULTS

The results obtained on pH, viscosity and crushing time are given in Figures 1 to 4, and Tables 1 to 5. The figures show typical curves and are taken from the data of one specimen from each group in run 4.

When the duplicating compound was stored at 52°C., the viscosity increased while the pH decreased (Table 1 and Fig. 1). In Figure 1 it is shown that the crushing time decreased rapidly. When the duplicating material was subjected to the heating-gelation cycle (Table 2 and Fig. 2), pH decreased whereas changes in viscosity were inconsistent with what would be anticipated from an electroviscous effect. The decrease in crushing time was not as rapid as it was when the compound was held at 52°C., nor were the same low values reached.

The agar-agar sol, when stored at 52°C. (Table 3 and Fig. 3), showed a decrease in viscosity in almost all specimens. The change in pH showed no general trend; some specimens displayed an over-all increase, some an over-all decrease, with increases and decreases in pH at different periods in the run. The crushing time fell to an indeterminable point fairly rapidly (Fig. 3). Table 4 and Figure 4 show that the agar-agar sol decreased in pH and viscosity on being subjected to the heating-gelation cycle. The crushing time in this instance also fell to an indeterminable point quite rapidly (Fig. 4). The reduction of pH may be due to the liberation of free sulfuric acid arising from the hydrolysis of the sulfuric acid ester linkage which occurs in the agar-agar molecule.

When the duplicating material, which had been allowed to stand at 52°C. and had reached a high viscosity and low crushing time, was reboiled for one hour, the viscosity decreased considerably and the crushing time increased to a point similar to that for the reboiled material of the same age. When the duplicating material which had been subjected to the heating-gelation cycle was stored at 52°C. for a period of five days, the viscosity increased and the crushing time decreased. The condition of high viscosity and low crushing time was partially reversed by boiling, whereas the condition of low viscosity and high crushing time was partially reversed by storage of the material. As can be seen from the tables, both agar-agar and the duplicating compound displayed typical non-Newtonian behavior. It was also found that both materials displayed thixotropy, although the curve of torque versus rpm was not linear for decreasing rpm.

As can be seen in Table 3, the mean deviation was relatively high in runs 2 and 4. This deviation was due to one specimen in each run which did not have the general trend in viscosity as did the other specimens in the run. The pH and viscosity values for each run are given in Table 5 which shows the average values for all the specimens of the run; the specimen whose viscosity is anomalous and the data for this specimen at each age period were eliminated in computing the average. The effect on the mean deviation is slight initially, but becomes more pronounced toward the end of the run.

Figures 1 and 2 show a difference in the rates of change in the crushing times and the slopes of the viscosity curves between the stored and reboiled duplicating materials. Such a difference might be due to the formation of crystals, or ordered regions, in the gel, or due to a chemical difference between the materials.

To determine if crystals or ordered regions were formed, roentgen ray diffraction patterns were made on gels of stored and reboiled materials of the same age. The patterns were typical roentgen ray scattering curves of amorphous materials that showed no tendency to form crystals or ordered regions.

That a chemical change had occurred was indicated by the change in pH. To determine if there was some significant

Table 2 • pH and viscosity of duplicating material reboiled daily

Run	Age in days	No. of spec.	pH	Viscosity in poise			
				2 rpm	4 rpm	10 rpm	20 rpm
1	1	3	8.06±0.00	127 ± 1	75.0± 0.7	41.0±0.8	26.0 ±0.5
	3	3	8.01±0.07	57 ± 2	35 ± 2	20.0±1.6	13.3 ±1.2
	6	3	7.86±0.01	57 ± 2	32 ± 2	18.5±1.3	12.3 ±0.6
	10	3	7.65±0.04	59 ±21	36 ± 12	22.1±6.0	16.6 ±3.1
3	1	2	8.04±0.02	24.6± 0.8	17.5± 0.0	11.0±0.5	7.97±0.49
	4	2	7.78±0.00	65.8± 7.4	38.2± 3.4	21.6±2.4	14.1 ±1.4
	11	2	7.52±0.01	98 ± 4	56.0± 2.0	29.1±1.1	18.4 ±0.2
	18	2	7.42±0.01	93 ± 0	55.0± 0.5	28.8±0.8	18.2 ±0.6
4	1	3	7.92±0.01	61 ±10	36 ± 5	19.8±1.9	13.0 ±0.6
	4	3	7.73±0.02	100 ± 5	60 ± 2	29.2±1.4	17.8 ±1.0
	8	3	7.64±0.01	69 ± 6	40 ± 4	21.4±2.4	13.8 ±1.5
	11	3	7.43±0.01	127 ±19	72 ±11	38.1±4.3	23.9 ±2.0
	17	3	7.34±0.01	55 ± 8	35 ± 5	19.1±2.5	12.6 ±1.3
	23	2	7.24±0.01	35 ± 1	22 ± 0	12.6±0.1	8.9 ±0.7
	32	2	7.30±0.00	70 ±25	40 ±13	20.5±6.0	13.2 ±3.5

Table 3 • pH and viscosity of agar-agar stored at 52°C.

Run	Age in days	No. of spec.	pH	Viscosity in poise			
				2 rpm	4 rpm	10 rpm	20 rpm
1	1	3	5.51 ± 0.07	21.8 ± 0.3	12.6 ± 0.2	6.55 ± 0.07	4.19 ± 0.11
	3	3	5.96 ± 0.01	17.2 ± 0.4	10.5 ± 0.2	5.74 ± 0.09	3.83 ± 0.04
	6	3	5.80 ± 0.01	12.0 ± 0.5	7.07 ± 0.21	3.75 ± 0.13	2.46 ± 0.08
	10	3	5.70 ± 0.05	9.2 ± 0.7	5.4 ± 0.3	2.81 ± 0.19	1.83 ± 0.14
2	1	5	5.76 ± 0.05	117 ± 16	64.1 ± 5.9	31.3 ± 3.2	19.2 ± 1.1
	4	5	5.81 ± 0.02	109 ± 12	61.1 ± 6.1	29.6 ± 2.4	18.3 ± 1.1
	7	5	5.98 ± 0.04	107 ± 10	60.9 ± 5.3	30.1 ± 2.8	18.5 ± 1.5
	10	5	5.74 ± 0.03	82 ± 21	46.0 ± 11.0	23.1 ± 4.9	14.3 ± 3.0
	14	5	6.00 ± 0.09	82 ± 18	45.0 ± 8.6	22.5 ± 6.7	13.9 ± 3.3
3	1	2	5.81 ± 0.02	1.1 ± 0.1	0.95 ± 0.05	0.70 ± 0.02	0.64 ± 0.01
	4	2	5.78 ± 0.04	0.40 ± 0.00	0.40 ± 0.05	0.38 ± 0.03	0.36 ± 0.03
	11	2	6.34 ± 0.20	0.3 ± 0.1	0.3 ± 0.0	0.30 ± 0.02	0.33 ± 0.05
	18	2	6.26 ± 0.02	0.4 ± 0.2	0.3 ± 0.1	0.20 ± 0.05	0.26 ± 0.04
4	1	3	5.65 ± 0.04	32.3 ± 4.6	20.9 ± 2.1	11.2 ± 1.2	7.44 ± 0.68
	3	3	5.18 ± 0.10	28.5 ± 8.1	17.8 ± 5.1	9.67 ± 2.22	6.46 ± 1.64
	7	3	5.19 ± 0.04	19.1 ± 8.6	11.2 ± 5.1	5.7 ± 2.6	3.59 ± 1.65
	10	3	5.20 ± 0.03	13 ± 7	7.7 ± 4.0	3.8 ± 2.0	2.3 ± 1.2
	16	3	5.13 ± 0.04	13 ± 8	7.2 ± 4.2	3.5 ± 1.7	2.08 ± 1.20
	22	2	5.03 ± 0.00	19.5 ± 10.7	10.8 ± 5.9	5.2 ± 2.8	3.1 ± 1.6
	31	2	5.11 ± 0.07	25.1 ± 17.1	13.9 ± 9.4	6.6 ± 4.3	3.4 ± 1.6

chemical difference between the stored and reboiled duplicating materials, infrared absorption spectra were made. The spectra were obtained from KBr pellets containing finely divided samples of stored and reboiled materials of the same age. No significant chemical difference was found between the materials. It was concluded, therefore, that neither the formation of ordered regions nor a significant chemical difference was responsible for the dissimilarity between

Table 4 • pH and viscosity of agar-agar reboiled daily

Run	Age in days	No. of spec.	pH	Viscosity in poise			
				2 rpm	4 rpm	10 rpm	20 rpm
4	1	3	6.21 ± 0.02	6.5 ± 0.6	4.6 ± 0.4	2.9 ± 0.3	2.26 ± 0.12
	3	3	5.99 ± 0.02	1.7 ± 0.4	1.5 ± 0.2	1.2 ± 0.1	1.1 ± 0.1
	7	3	5.99 ± 0.10	3.7 ± 1.8	2.6 ± 1.4	1.7 ± 0.6	1.4 ± 0.4
	10	3	5.83 ± 0.07	0.8 ± 0.2	0.7 ± 0.1	0.61 ± 0.14	0.57 ± 0.11
	16	3	5.58 ± 0.08	0.6 ± 0.1	0.4 ± 0.1	0.37 ± 0.12	0.40 ± 0.07
	22	3	5.53 ± 0.09	0.3 ± 0.1	0.3 ± 0.0	0.2 ± 0.0	0.29 ± 0.02
	31	3	5.14 ± 0.12	0.1 ± 0.1	0.2 ± 0.1	0.2 ± 0.0	0.1 ± 0.00
1	1	3	5.45 ± 0.01	19.8 ± 1.6	11.9 ± 0.4	6.58 ± 0.08	4.45 ± 0.07
	3	3	5.42 ± 0.01	3.63 ± 0.56	2.27 ± 0.21	1.47 ± 0.17	1.10 ± 0.15
	6	3	5.34 ± 0.06	2.2 ± 0.4	1.5 ± 0.2	0.92 ± 0.09	0.69 ± 0.07
	10	3	5.28 ± 0.09	0.3 ± 0.1	0.2 ± 0.0	0.20 ± 0.03	0.23 ± 0.01
3	1	2	6.43 ± 0.00	0.4 ± 0.1	0.4 ± 0.1	0.49 ± 0.01	0.50 ± 0.01
	4	2	6.19 ± 0.00	0.4 ± 0.2	0.4 ± 0.2	0.38 ± 0.05	0.42 ± 0.05
	11	2	5.91 ± 0.04	0.2 ± 0.0	0.2 ± 0.0	0.22 ± 0.02	0.30 ± 0.05
	18	2	5.72 ± 0.01	0.2 ± 0.1	0.2 ± 0.1	0.20 ± 0.01	0.20 ± 0.01

the two materials in crushing time and viscosity effects.

Some samples of duplicating material were stored at 52°C. and left undisturbed. In all instances complete gelation occurred between the sixth and ninth day of storage.

DISCUSSION

As shown in Figure 1, when agar-agar type duplicating compound was stored at 52°C., the viscosity increased whereas the crushing time decreased to a point that it would support a load of 300 Gm. per square centimeter for only two seconds. The increase in viscosity, exclusive of that due to pH change, may be attributed to bonding of the agar-agar molecule at first by secondary attractive forces at widely separated points followed by more bonding by nonlocalized secondary attractive forces as the material is allowed to age.[1]

Although some of the increase in the viscosity observed in the stored duplicating material is due to an electroviscous effect caused by the decrease in pH,

1. Ferry, John D. Protein gels. In Advances in protein chemistry, vol. IV. New York, Academic Press, 1948, p. 10-12.

Table 5 • Detail of pH and viscosity of agar-agar stored at 52°C. (runs 2 and 4)

Run	Age in days	No. of spec.	pH	Viscosity in poise			
				2 rpm	4 rpm	10 rpm	20 rpm
2	1	5	5.76 ± .05	117 ± 16	64.1 ± 5.9	31.3 ± 3.2	19.2 ± 1.1
		4	5.73 ± .04	120 ± 18	64.9 ± 6.7	31.5 ± 3.7	19.2 ± 1.6
		1	5.84	106	61.0	30.2	19.2
	4	5	5.81 ± .02	109 ± 12	61.1 ± 6.1	29.6 ± 2.4	18.3 ± 1.1
		4	5.81 ± .02	107 ± 13	60.5 ± 6.8	29.3 ± 2.5	18.2 ± 1.4
		1	5.82	116	63.5	31.0	18.6
	7	5	5.98 ± .04	107 ± 10	60.9 ± 5.3	30.1 ± 2.8	18.5 ± 1.5
		4	5.99 ± .04	106 ± 11	60.1 ± 5.2	29.7 ± 2.9	18.2 ± 1.4
		1	5.96	112	64.0	32.0	19.8
	10	5	5.74 ± .03	82 ± 21	46.0 ± 11.0	23.1 ± 4.9	14.3 ± 3.0
		4	5.73 ± .04	72 ± 11	40.4 ± 5.6	20.4 ± 2.1	12.6 ± 1.1
		1	5.77	121	68.5	33.9	21.3
	14	5	6.00 ± .09	82 ± 18	45.0 ± 8.6	22.5 ± 6.7	13.9 ± 3.3
		4	5.94 ± .03	70 ± 4	38.4 ± 2.3	19.2 ± 1.3	11.8 ± 0.7
		1	6.22	128	71.5	35.7	22.0
4	1	3	5.65 ± .04	32.3 ± 4.6	20.9 ± 2.1	11.2 ± 1.2	7.44 ± 0.68
		2	5.64 ± .05	33.8 ± 4.8	22.0 ± 2.1	11.7 ± 1.3	7.78 ± 0.68
		1	5.67	29.2	18.8	10.1	6.76
	3	3	5.18 ± .10	28.5 ± 8.1	17.8 ± 5.1	9.67 ± 2.22	6.46 ± 1.64
		2	5.26 ± .02	22.4 ± 1.6	14.0 ± 0.5	7.76 ± 0.16	5.23 ± 0.31
		1	5.04	40.6	25.4	13.5	8.92
	7	3	5.19 ± .04	19.1 ± 8.6	11.2 ± 5.1	5.7 ± 2.6	3.59 ± 1.65
		2	5.16 ± .02	12.7 ± 1.1	7.3 ± 0.7	3.8 ± 0.3	2.35 ± 0.15
		1	5.25	32.0	18.9	9.6	6.06
	10	3	5.20 ± .03	13 ± 7	7.7 ± 4.0	3.8 ± 2.0	2.3 ± 1.2
		2	5.19 ± .03	8.2 ± 0.8	4.7 ± 0.5	2.3 ± 0.3	1.4 ± 0.3
		1	5.22	23.8	13.7	6.76	4.14
	16	3	5.13 ± .04	13 ± 8	7.2 ± 4.2	3.5 ± 1.7	2.08 ± 1.20
		2	5.14 ± .01	7.0 ± 2.0	4.0 ± 1.0	1.9 ± 0.6	1.18 ± 0.36
		1	5.03	24.0	13.5	6.52	3.88
	22	2	5.03 ± .00	19.5 ± 10.7	10.8 ± 5.9	5.2 ± 2.8	3.1 ± 1.6
		1	5.03	8.8	4.9	2.4	1.5
		1	5.03	30.2	16.7	7.96	4.72
	31	2	5.11 ± .07	25.1 ± 17.1	13.9 ± 9.4	6.6 ± 4.3	3.4 ± 1.6
		1	5.18	8.0	4.5	2.3	1.4
		1	5.04	42.2	23.3	11.0	6.36

there are three phenomena which indicate that the agglomeration of agar-agar molecules contributes to this increase: first, the fact that complete gelation occurs in the duplicating material after a few days of undisturbed storage at 52°C.; second, the increase found in the viscosity of some of the samples of agar-agar sol, even though the pH is changing in a direction which should cause a decrease in viscosity; finally, the fact that the duplicating material reboiled for one hour displays no correlation with the change in pH. If the material had been reboiled for longer periods of time than one hour, the viscosity would probably have decreased continuously because of a more complete breakdown of the hydrogen bonds.

The decrease in crushing time as the material ages at 52°C. could also be explained on the basis of increased hydrogen bonding with age. If a specimen was prepared from the material when it had been stored only for two or three days, the bonding would appear schematically as shown in Figure 5,a.

If a sample for crushing were prepared from the same material which was somewhat older, schematically, the hydrogen bonding would appear as in Figure 5,b.

The few bonds shown in Figure 5,a permit deformation so that many bonds must be severed simultaneously to rupture the specimen. In Figure 5,b, the many bonds stiffen the specimen and little deformation is possible. Consequently, one bond at a time may be broken resulting in a low crushing time. Further measurements on the mechanical properties of agar gels are required to substantiate this hypothesis.

SUMMARY

1. When agar-agar type duplicating material was stored at approximately 52°C. as recommended by the manufacturers, the viscosity increased considerably whereas the crushing time decreased.

2. When the agar-agar type duplicating material was reheated daily by immersion in boiling water, the crushing time decreased slowly but there was no correlation between the change in viscosity and the change in pH.

3. In agar-agar type duplicating material stored undisturbed at 52°C., gelation occurred within six to nine days.

4. The changes in the physical properties of agar-agar type duplicating compound stored at 52°C. compared with those in the material which has been subjected to the heating-gelation cycle may be explained by postulating increased intramolecular and intermolecular hydrogen bonding.

Reason and Progress • The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man. *George Bernard Shaw, Maxims for Revolutionists.*

Porosities in dental gold castings

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A study of porosities in dental gold castings has as its purpose the further refinement of the dental gold casting procedure.

A survey of the dental literature shows that porosities have been given rather limited attention as compared to other aspects of the casting procedure. Coleman,[1] Shell,[2] Sturdevant,[3] Crawford[4] and Boulger[5] advocated thick sprues or reservoirs as the means of avoiding shrinkage porosity. Coleman[6] has illustrated shrinkage porosity and porosity due to occluded gas. Brumfield[7] has published a classification of porosities in the following groups: shrinkage porosity and porosity due to occluded gases, absorbed gases, steam and foreign matter; Skinner[8] used a similar classification.

Phillips[9] studied back pressure porosity as affected by positioning of the castings in the ring. Coleman,[10] Peyton[11] and Crawford[4] have called attention to the significance of porosity for physical properties of dental golds.

PURPOSE AND METHOD OF STUDY

Although the investigators mentioned have described various types of porosities, there is still a lack of information as to the importance of individual technical procedures in producing porosities. The purpose of this investigation was to study some of the variables which might contribute to porosities in dental gold castings.

If the shrinkage of the alloy on solidification is not compensated for by feeding of more gold into the mold, porosities occur. When a long, thin sprue is used, this will solidify before the bulk of the

Presented in part before the Dental Materials Group, International Association for Dental Research, Chicago, Ill., March 1955.

Alloys were furnished by the courtesy of the Spyco Smelting & Refining Co. and the J. F. Jelenko & Co., Inc., who supplied the Thermotrol casting unit.

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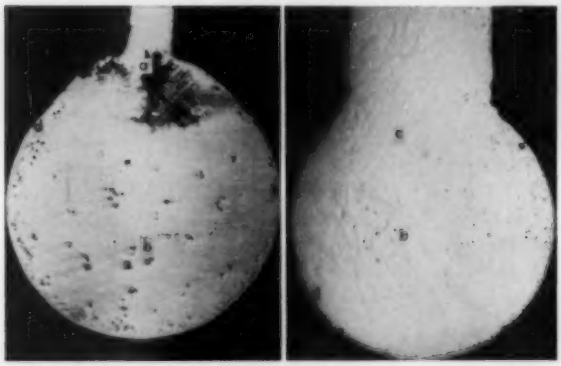

Fig. 1 • Spherical gold castings. a, localized shrinkage porosity; b, microporosity; c, pinhole porosity and d, subsurface porosity

casting; the feeding of gold from the sprue button is thereby cut off, and localized shrinkage porosity occurs near the sprue attachment (Fig. 1,a). If the mold temperature is low or the alloy temperature is close to the melting range, the solidification may occur so fast that shrinkage develops throughout the cast-

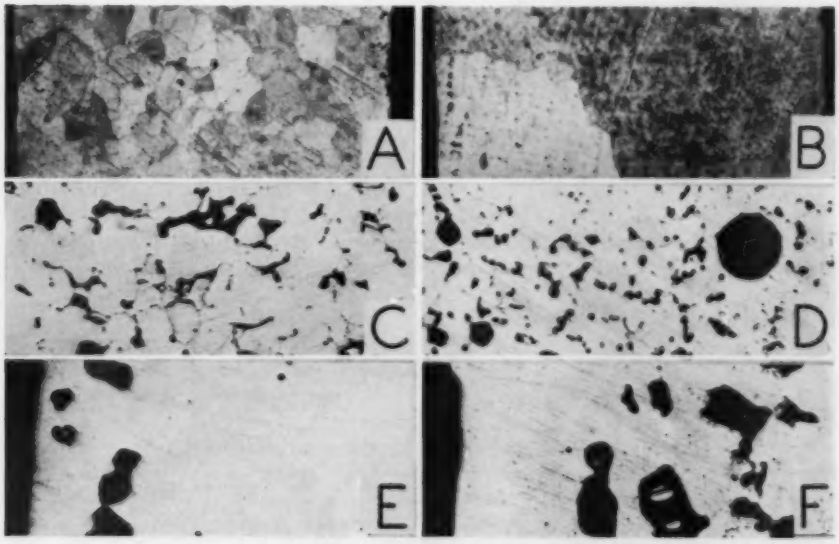

Fig. 2 • A: Grain size in casting made with 3 mm. (short), 10 gauge (thick) sprue. B: Grain size in casting made with 9 mm. (long), 10 gauge (thick) sprue. C: Localized shrinkage porosity (see also Figure 5,A). D: Microporosity and gas inclusions (see also Figure 5,D). E: Subsurface porosity (see also Figure 6,A). F: Subsurface porosity (see also Figure 6,B)

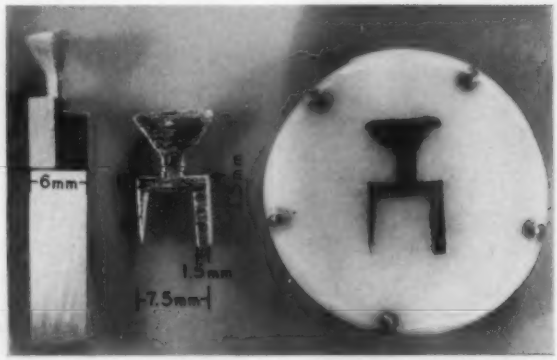

Fig. 3 • Steel die, sectioned casting and prepared specimen

ing. Such shrinkage porosity is termed microporosity (Fig. 1,b).

If the gold is overheated or kept in a molten stage for a long time, large amounts of gas may be dissolved or absorbed in the metal. On solidification, part of this gas may precipitate, causing pinhole porosity, globular pockets of gas distributed throughout the casting (Fig. 1,c).

Gas inclusions occur when adsorbed or mechanically trapped gas is carried into the mold by the alloy. They resemble pinhole porosities but are usually larger (Fig. 2,D).

A fifth type of porosity not previously described in the literature is the subsurface porosity (Fig. 1,d). The mechanism responsible for this type of porosity will be discussed later in this paper.

METHOD

Thirty castings were first made in the form of spheres of different diameters, using various lengths and diameters of sprues. These preliminary castings demonstrated various types of porosities as shown in Figure 1.

Because of the dissimilarity of the spherical castings to dental castings, a steel die was made to simulate an MOD type inlay preparation. Three hundred castings were made from wax patterns obtained on this die (Fig. 3). The variables introduced were: length of sprue, thickness of sprue, location of sprue, location of pattern in casting ring, alloy temperature, mold temperature and method of melting the alloy.

Throughout this investigation each combination of these variables chosen for study was reproduced in a series of six castings using a standardized method for obtaining uniform wax patterns, uniform positioning of the wax pattern in the ring, uniform investing, and burnout procedure. The samples chosen for illustrations, therefore, each represent six specimens made under identical conditions.

An electrically controlled casting unit (Thermotrol) was used for melting the alloy at various temperatures; also, castings were made using a natural gas-air blowtorch. Two type B alloys and one type C alloy were used.

Each casting was sectioned with a small saw, then mounted and prepared for microscopic examination and photographic recording. The technic of metallurgical preparation was found to be extremely critical since porosity was very easily burnished over. The method

adopted included in its final steps alternate polishing and etching. A 15 second etching in 50 per cent aqua regia was used between successive lappings with levigated alumina of 0.5 micron particle size under very light pressure.

Figure 4 shows that porosity may be covered easily by burnishing. The same specimen is shown (1) after metallurgical polish with moderate pressure and (2) after the polishing procedure employed in this study.

OBSERVATIONS

As indicated previously, five types of porosity could be distinguished in this study: localized shrinkage porosity, pinhole porosity, gas inclusions, microporosity and subsurface porosity.

Sprue Length and Thickness • The effect of sprue length and thickness was studied in 54 castings made under identical conditions of mold temperature (1,250°F.) and gold temperature (1,850°F., Thermotrol casting unit). The sprue dimensions used were: 18, 14 and 10 gauge, Brown & Sharpe, (1.02, 1.63 and 2.59 mm.) with 3, 6 and 9 mm. lengths. Six castings were made with each sprue length and sprue thickness combination.

Only the 18 castings with 10 gauge sprues (of 3, 6 and 9 mm. lengths) were free of shrinkage porosity. In 36 castings with 14 and 18 gauge sprues, shrinkage porosity was found in all instances, with more porosity, the longer or thinner the sprue (Fig. 1, 2,C, and 5,A and B).

Location of Sprue and Shrinkage Porosity • To study the relationship between the location of the sprue and the location and extent of shrinkage porosity and also to differentiate this type of porosity from other types, a series of six castings was made with an 18 gauge, 3 mm. sprue attached at different points on the wax pattern. It was evident that shrinkage porosity occurred at the attachment of the sprue. It was evident also that the least amount of shrinkage porosity was observed when the sprue was located near the center of mass of the casting.

When series of six castings of each sprue length and thickness combination were made into molds at 900°F., 500°F. and room temperature, shrinkage porosity tended to become less localized, in some instances making it difficult to distinguish between subsurface porosity and shrinkage porosity. Castings with 18 gauge sprues were often incomplete near the point of sprue attachment when made in

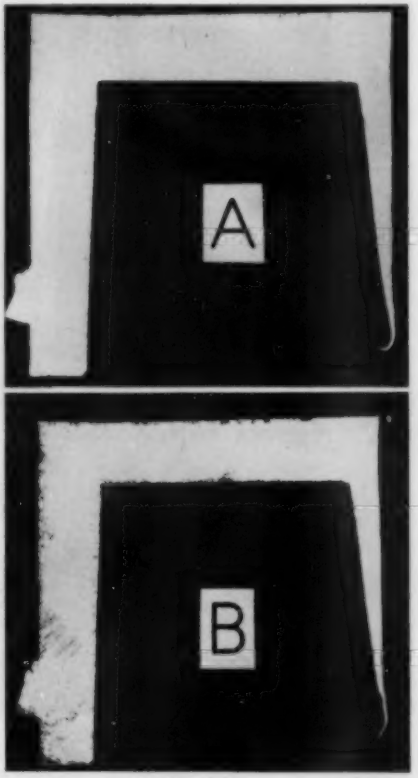

Fig. 4 • A: Normal metallurgical polish; porosity covered by burnishing. B: Same specimen after polish employed in this study; porosity revealed

molds at 500°F. and at room temperature, apparently because the sprue solidified before the mold was filled sufficiently.

Pinhole Porosity and Gas Inclusions • Pinhole porosity, generally attributed to absorbed gases, and gas inclusions were found to occur in relatively insignificant amounts throughout this study. However, some pinhole porosity occurred in castings when natural gas-air was used for melting the alloy at high temperatures, approximately 2,000°F. This type of porosity is shown in Figure 1 and 5,C. Gas inclusions occurred when the alloy was melted with a natural gas-air blowtorch. The amount of porosity was most extensive when the alloy was heated only slightly above its melting range (Fig. 2,D, and 5,D).

Microporosity • Microporosity also was observed in this study. This type of porosity occurred throughout castings made in molds at 500°F. or room tem-

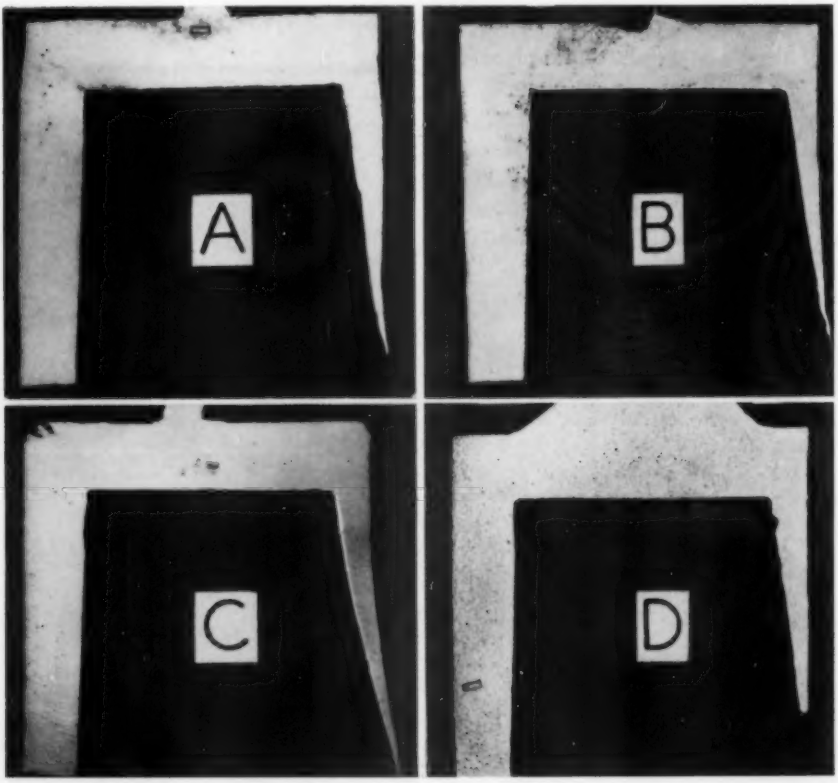

Fig. 5 • A: Shrinkage porosity in casting made with 3 mm. (short), 18 gauge (thin) sprue. Area outline is shown in higher magnification in Figure 2,C. B: Localized shrinkage porosity in casting made with 9 mm. (long), 18 gauge (thin) sprue. C: Pinhole porosity throughout casting made with alloy heated above 2,000°F. D: Microporosity and gas inclusions (large, circular pores) in casting made with alloy heated slightly above its melting range. Area outlined is shown in higher magnification in Figure 2,D

perature and with an alloy temperature within or slightly above the melting range (Fig. 1, 2,D, and 5,D).

Subsurface Porosity • A fifth type of porosity found in this study was the subsurface porosity, shown in Figure 1, 6 and 7. It was observed that subsurface porosity increased not only by an increase in either alloy temperature or mold temperature but also by the use of short, heavy sprues.

Figures 2,E, and 6,A and C, show castings made at the same temperature, 1,850° in a 1,250° mold using 10 gauge sprues of 3 and 9 mm. lengths. The use of the shorter sprues resulted in more subsurface porosity. It was also found that the use of thicker sprues resulted in more subsurface porosity than did the use of thin sprues.

The increase of subsurface porosity as a result of increased alloy temperature is shown in Figure 6,B. This casting was

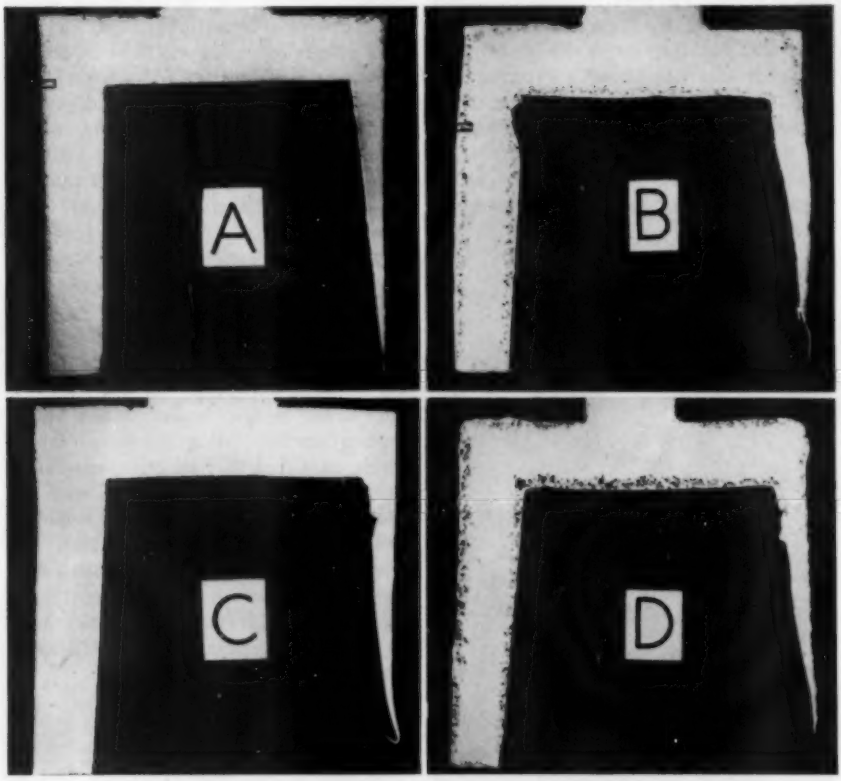

Fig. 6 • A: Subsurface porosity in casting made with 3 mm. (short), 10 gauge (thick) sprue. Area outlined is shown in higher magnification in Figure 2,E. B: Increase in amount of subsurface porosity in casting identical to that in A except for increase in alloy temperature. Area outlined is shown in higher magnification in Figure 2,F. C: Sound casting made with 9 mm. (long), 10 gauge (thick) sprue. D: Increase in amount of subsurface porosity in casting identical to that in A except for increase in mold temperature

taken from a series of castings made with 10 gauge, 3 mm. sprues using alloy casting temperatures ranging from 1,725°F. through 2,100°F. Subsurface porosity was most prevalent at the higher casting temperatures.

To determine the effect of an increase in mold temperature on subsurface porosity, a high heat investment (used commercially for base metal alloys) was employed. Subsurface porosity increased with an increase in mold temperature (Fig. 2,F, and 6,D).

The use of this high heat investment also demonstrated that subsurface porosity was not caused by reaction between the alloy and gypsum, since the high heat investment did not contain gypsum, nor by back pressure, because this type of investment is much more porous than the conventional gypsum investment. Figure 7 shows subsurface porosity near all surfaces including the sprue and sprue button in a casting from this series.

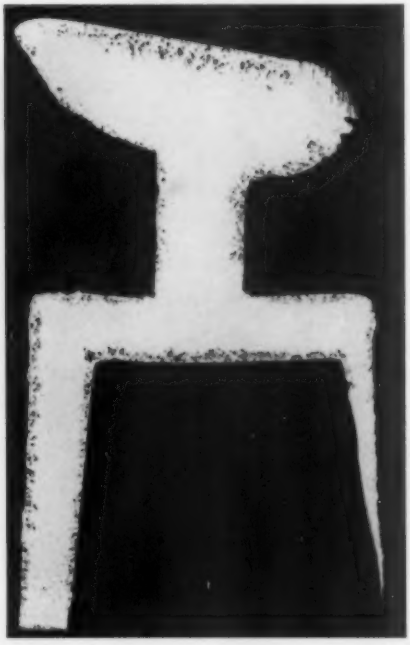

Fig. 7 • Same specimen as in Figure 6,D, showing subsurface porosity near all surfaces of casting, sprue and button

The occurrence of subsurface porosity was found to be independent of the shape of the mold. This type of porosity was observed in the aforementioned, spherically shaped castings (Fig. 1) and also in inlays of various size and shape which were picked at random from student castings made at the dental clinic of Marquette University School of Dentistry.

The different types of porosity described were also found in castings which were produced by natural gas-air melting. The effects of variation of sprue dimensions and alloy and mold temperatures were found to be similar to those described previously; however, the reproducibility within each group of six castings was less, and the types of porosity were more difficult to distinguish.

Grain Size • The grain size was observed in castings produced with various sprue sizes and with various casting methods and temperatures. Grain sizes were consistently larger in castings made in the electrically controlled casting unit as compared to the ordinary centrifugal casting machine using the gas-air blowtorch, provided that all other conditions were equal. This finding agrees with the fact that cooling occurs faster in the ordinary casting machine. In both machines, increased sprue length caused an increase in grain size (Fig. 2,A and B).

The significance of grain size as related to tensile properties of various gold alloys is presently under investigation.

DISCUSSION

The mechanism responsible for shrinkage porosity, pinhole porosity, microporosity and gas inclusions is well established, and the experimental evidence of this and other studies is in agreement with the theory.

Subsurface porosity is considered by some authors[7, 12] as a type of gas porosity. If subsurface porosity were gas porosity, it would be found distributed uniformly throughout the casting.

The evidence here presented suggests that subsurface porosity belongs to the cooling and solidification type of porosity. Such porosity is characterized by its formation in the interstices of the dendritic structure. Subsurface porosity therefore is believed to occur when the center mass of the alloy remains liquid for an interval of time before it solidifies. On solidification, it then contracts away from the already solidified skin of the casting, which possesses some strength and is mechanically locked to the walls of the mold.[12]

Subsurface porosity was found in instances in which metal was fed into the mold rapidly and at rather high alloy or mold temperatures. Slower feeding (long or thin sprues) or lower alloy or mold temperatures eliminated subsurface porosity, apparently because of rapid solidification throughout the casting on contact with the mold, so that less time difference occurred between the solidification of the peripheral and central part of the casting.

SUMMARY

Under the experimental conditions employed in this investigation, it was found that porosities in gold castings could be classified into two groups:

1. Porosities caused by cooling and solidification.
    a. Localized shrinkage porosity.
    b. Subsurface porosity.
    c. Microporosity.
2. Porosities caused by gas.
    a. Pinhole porosity.
    b. Gas inclusions.

These types of porosity are all internal porosities and can be readily distinguished from external porosities, such as back pressure porosity described by Phillips,[9] and external porosity due to incomplete burnout (Coleman,[1] Brumfield[7]), or external porosity due to insufficient casting pressure or foreign particles.

The conditions under which internal porosities were found in this study are listed:

1. Porosities caused by cooling and solidification.

a. Localized shrinkage porosity occurred when a 3, 6 or 9 mm., 18 gauge sprue was used. Less localized shrinkage porosity occurred when 14 and 10 gauge sprues were used. A sprue thickness larger than the largest cross section of the casting was necessary to eliminate localized shrinkage porosity for all sprue lengths employed. Nine millimeter, 18 gauge or 14 gauge sprues (thinner than largest cross section of casting) caused more localized shrinkage porosity than 3 mm. sprues of same thickness. When an 18 gauge or 14 gauge sprue was used, the localized shrinkage porosity occurred in the greatest quantity at low mold temperatures (room temperature, 500°F. and 900°F.) and low alloy temperatures (1,750°F. and 1,800°F.). More localized shrinkage porosity was seen as the sprue location was moved farther from the center of the mass of the casting.

b. Subsurface porosity occurred when a 3 mm., 10 gauge sprue (thicker than the largest cross section of the casting) was used and the alloy temperature was more than 100°F. above the melting range of the alloy and the mold temperature was more than 900°F. Increase in sprue length to 6 or 9 mm. and decrease in sprue thickness to 14 or 18 gauge reduced the subsurface porosity. Increase in alloy temperature and mold temperature increased the subsurface porosity.

c. Microporosity was found when the mold temperature was 500°F. and below,

12. Eastwood, La Verne Winfield. Gas in light alloys. New York, J. Wiley & Sons, Inc., 1946, p. 53.

Table • Effect of various factors on porosity

Type of porosity	Increased sprue thickness	Increased sprue length	Increased alloy temperature	Increased mold temperature
Localized shrinkage porosity	Decreased	Increased	Decreased	Decreased
Subsurface porosity	Increased	Decreased	Increased	Increased
Microporosity	No effect	No effect	Decreased	Decreased

and the alloy temperature was close to the melting range. Less microporosity was found at higher alloy temperatures. No relationship was established between sprue size and microporosity.

2. Porosities caused by gas.

a. Pinhole porosity occurred when the alloy was cast at a very high temperature (more than 200°F. above the melting range). No relationship was established between sprue size and pinhole porosity.

b. Gas inclusions were found when the alloy was cast at very low temperatures (within or slightly above the melting range). No relationship was established between sprue size and gas inclusions.

The effect of certain manipulative factors on the extent of porosity caused by cooling and solidification is shown in the table.

CONCLUSIONS

Specimen preparation was found to be extremely critical since porosities are easily burnished over by metallurgical polishing. A method is described by which porosities may be revealed.

Castings with little or no porosity were produced only under the following conditions:

1. With a sprue of a diameter larger than the thickest cross section of the casting to eliminate shrinkage porosity.

2. With a sprue of sufficient length (9 mm.) to eliminate subsurface porosity.

3. With a gold temperature approximately 100°-150°F. above the melting range of the gold to eliminate microporosity and gas inclusions. Lower gold temperatures caused microporosity and gas inclusions, whereas higher gold temperatures caused subsurface porosity.

4. With a mold temperature of 900° to 1,250°F. Lower mold temperatures caused microporosity and gas inclusions, whereas high mold temperatures caused subsurface porosity.

Humility in Great Scientists • It is the facing of the inscrutable that gives at the same time humility and stature to the investigator who, like Copernicus, Leonardo da Vinci, Darwin, Einstein or Freud, watches his universe expand directly in proportion to the manner in which he has placed it on his own reducing screen. *Gardner Murphy. In the Minds of Men.*

Dental characteristics associated with acrosclerosis and diffuse scleroderma

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The dental roentgenogram of some patients suffering from acrosclerosis and diffuse scleroderma is characterized by widening of the periodontal membrane space at the expense of alveolar bone. This was observed by Stafne, and, in 1944, Stafne and Austin,[1] in a review of records of 127 patients suffering from the diseases named, found the characteristic roentgenographic evidence in nine, or 7.08 per cent, of the cases studied. In four instances, a tentative diagnosis of scleroderma had been made in the course of routine dental examination, and the diagnosis was confirmed later by general physical examination.

Dental features of the disease emphasized by Stafne and Austin[1] are as follows:

1. Widening of the periodontal membrane space occurs at the expense of alveolar bone, and the lamina dura is obliterated.
2. The periodontal space of a posterior tooth is more likely to be involved than the corresponding space of an anterior tooth.
3. Of an involved tooth, the increase in width of the periodontal membrane is fairly uniform around the entire root.
4. The affected teeth are not in supraclusion.
5. Affected teeth are surprisingly firm in their sockets considering the increase in width of the periodontal membrane space.
6. Almost without exception, the gingival attachment of the affected teeth is unbroken and the gingival crevice is of normal depth.

On microscopic examination of the tissues contained in the thickened periodontal membrane space, evidence neither of gingivitis nor of periodontitis is found, but the arrangement of the collagenous fibers of these tissues is not normal. The walls of the contained blood vessels are thickened and the lumina narrowed, a feature characteristic of the vessels of skin involved by scleroderma and acrosclerosis.

Since 1944, few cases of acrosclerosis and diffuse scleroderma with these characteristic dental features have been reported. In several reported cases, however, the oral mucosa was involved, particularly that part of it which overlay the alveolar process.[2,3]

Krogh,[4] in 1950, reported the case of a woman nurse, 50 years of age, who received the diagnosis of scleroderma

Section of dentistry and oral surgery, Mayo Clinic and Mayo Foundation, graduate school, University of Minnesota.

1. Stafne, E. C., and Austin, L. T. Characteristic dental finding in acrosclerosis and diffuse scleroderma. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 30:25 Jan. 1944.
2. Afonsky, D. Case of scleroderma. Ann. Den. 7:52 June 1948.
3. Barber, H. W. Circumscribed scleroderma of buccal mucous membrane. Proc. Roy. Soc. Med. 37:73 Jan. 1944.
4. Krogh, H. W. Dental manifestation of scleroderma: report of case. J. Oral Surg. 8:242 July 1950.

on the basis of the dental roentgenographic findings. Such roentgenograms made June 13, 1947, revealed the characteristically thickened periodontal spaces about the upper and lower left bicuspids; dental roentgenograms of the same region made May 16, 1949, showed normal periodontal space. This constituted evidence that the widening of the periodontal space had been reversible. The general disease had not progressed noticeably in the interval.

Rosenthal,[5] in 1948, studied the case of a woman 44 years of age, who had scleroderma. The periodontal membranes of the remaining upper teeth were thickened.

Davis and Saunders,[6] in 1946, reported the case of a white woman 20 years of age who was suffering from scleroderma of the face and gingivae. Two dentists to whom the patient was referred expressed the opinion that the gingiva showed an advanced degree of periodontal disease, although they could not explain why the condition was confined to a single tooth in the region of the involved gingiva. Biopsy of the gingiva established the diagnosis of scleroderma. What was thought to be evidence of advanced periodontal disease may have been widening of the periodontal membrane space accompanying scleroderma.

Material on the general symptoms, etiology, classification, histologic changes and treatment of acrosclerosis and diffuse scleroderma is contained in an excellent paper by O'Leary and Waisman.[7] Also, in the dental literature, Looby and Burket,[8] in 1942, covered the general disease entity.

REPORT OF CASE

A white woman, 18 years of age in January 1944, first had noted numbness of the hands and feet on exposure to cold and during emotional upsets. In November, a diagnosis of Raynaud's disease and scleroderma of the fingers, grade 1, was made at the Mayo Clinic.

The woman was seen again in August 1948, when she was 22 years of age. On this admission the patient related that about February 1946, she had noticed tightness of the skin of the arms and, in February 1948, tightness of the skin of the thorax and face. This had been accompanied by mild dysphagia and some difficulty in opening the mouth. The patient first had noticed this difficulty when she had visited her dentist some months before.

Roentgenograms made in August 1948 gave evidence of mild esophageal involvement. There was a dirty-brown pigmentation of the skin of the upper half of her body, slight ulceration of one fingertip and some telangiectatic spots around the face and neck. Dental roentgenograms were made at this time. There was some evidence of widening of the space normally occupied by the periodontal membrane. This was especially noteworthy of the upper left posterior teeth, particularly of the molars (Fig. 1, a).

The patient was seen frequently through 1948, 1949 and 1950. During this period appreciable benefit was not obtained from medication and physical therapy. Ulceration developed on some fingertips, but in general the condition changed little.

The patient was seen again in April 1954. In September 1952, she had given birth to a normal baby. Both the patient and her husband believed that her pregnancy had been accompanied by partial remission of her disease. The improved state had persisted for about six

5. Rosenthal, I. H. Generalized scleroderma (hidebound disease, its relation to the oral cavity, with case history and dental restoration). Oral Surg., Oral Med. & Oral Path. 1:1019 Nov. 1948.

6. Davis, W. C., and Saunders, T. S. Scleroderma of the face involving the gingiva: report of case. Arch. Dermat. & Syph. 54:133 Aug. 1946.

7. O'Leary, P. A., and Waisman, Morris. Acrosclerosis. Arch. Dermat. & Syph. 47:382 March 1943.

8. Looby, J. P., and Burket, L. W. Scleroderma of face with involvement of alveolar process. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 28:493 Sept. 1942.

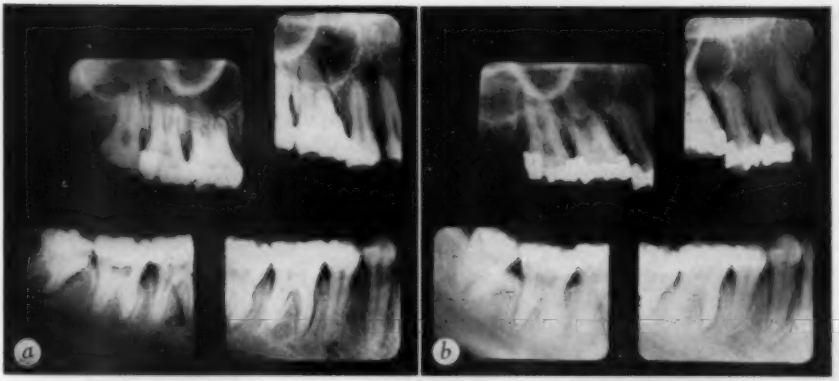

Fig. 1 • Left posterior teeth, maxillary and mandibular. Note increase in width of periodontal membrane spaces, especially of maxillary left first and second molars, between 1948 (view a) and 1954 (view b)

months after parturition. At the time of her admission in April 1954, her chief complaint was of persistent ulceration of the fingertips, worse than it ever had been. She thought that the added work of caring for the child might have contributed to development of the ulcers. There was also ulceration of the tip of one toe.

At this time (April 1954), the patient complained of discomfort in the upper left molar region, and dental roentgenograms again were made. Some of the periodontal spaces, especially those of the upper left molar region, were even wider than they had been in 1948. The upper third molar on the left side had been removed since the 1948 films had been made (Fig. 1, a and b). Clinical examination revealed that about the upper left first and second molars, formation of periodontal tissue was greatly excessive and infection had become superimposed. For this reason, removal of the upper left first and second molars when convenient for the patient was recommended.

In due time, the patient's dentist sent the removed teeth. He reported that, with application of forceps to one of the molars, the other molar was delivered; the two teeth were attached to one another by a firm mass of tissue (Fig. 2, above left). Since the teeth were removed in this manner, it is reasonable to assume that some of the tissue was left attached to the walls of the alveolar sockets.

The specimen was decalcified, and microscopic sections were made. The low-power view represented in Figure 2, above right, was characteristic of both removed teeth. The roots were surrounded by the mass of fibrous tissue which was many times thicker than normal periodontal membrane. According to Orban,[9] normal periodontal membrane is from 0.8 to 0.38 mm. thick. The thickest portion of fibrous tissue in the section illustrated was about 3 mm. Scattered throughout the fibrous tissue were many spicules of bone which had not yet been replaced by fibrous tissue.

In careful examination of this section under higher magnification, no resemblance to the normal arrangement of the collagenous fibers of periodontal mem-

9. Orban, Balint. Oral histology and embryology. St. Louis, C. V. Mosby Co., 1944, p. 172-188.

brane could be found. The fibers were firmly attached to cementum and, as they left the cementum, they ran diagonally in an apical direction, parallel to the long axis of the root. Continuity of the individual fibers was lost a short distance from the cementum. The blood vessels were thickened and their lumina narrowed; this, as has been said earlier in this paper, is a histologic feature

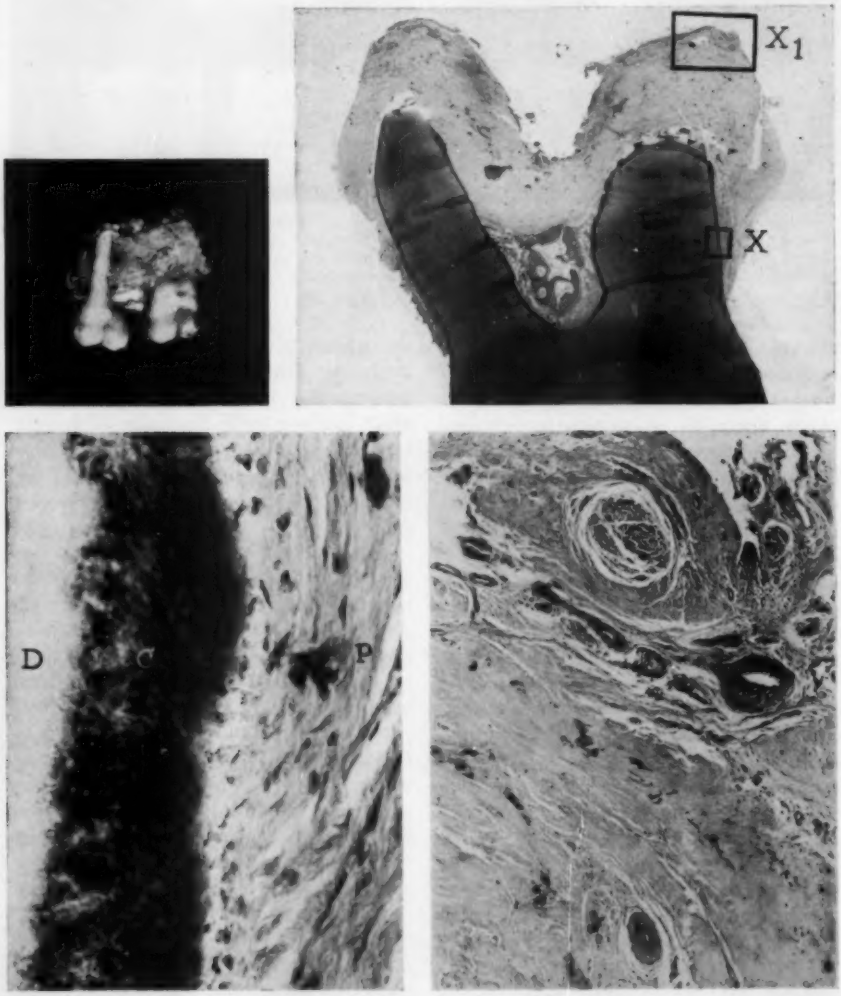

Fig. 2 • Above left: Upper left first and second molars, with large quantity of periodontal fibrous tissue attached. Above right: Cross section of upper left first molar. Below left: Detail of area X in view above right. Collagenous fibers are attached firmly to cementum, their direction is apical and almost parallel to long axis of root. D, dentin; C, cementum; P, periodontal membrane. Below right: Detail of area X_1 in view above right. Note thickened walls of blood vessels and narrowed lumina

which also is seen in the vessels of the skin in scleroderma.[10]

The sections shown in Figure 2, below, are from the middle third of the root and from the apical region. They illustrate (1) the direction of the collagenous fibers, (2) the loss of continuity of these fibers occurring shortly after their leaving the cementum and (3) the thickened walls and narrow lumina of the blood vessels.

COMMENT

Much of the foregoing is derived from records of the Mayo Clinic, which include a photograph taken in 1948; then the patient appeared normal and well developed. I first saw her in October 1954, at which time she was not recognizable from the 1948 photograph. She was unable to close her lips completely over her anterior teeth. Her face was shrunken considerably, and the width of the dental arches was greatly reduced. The skin of the entire face was extremely tight, so that examination of the teeth and mouth was difficult. To my knowledge, in no other systemic disease is the periodontium affected in the manner that has been described.

SUMMARY

In a case of scleroderma, dental characteristics were extreme examples of those reported by Stafne and Austin:[1] widening of the periodontal membrane space at the expense of alveolar bone; obliteration of the lamina dura; involvement especially of posterior teeth; loss of normal arrangement of collagenous fibers of the periodontal membrane, and thickening of the walls, with accompanying narrowing of the lumina, of the blood vessels of the periodontal membrane.

10. Montgomery, Hamilton. Personal communication.

Fluoridated Water vs. the Fountain of Youth • On the anti side, one remarkable quote attributed to Charles E. Perkins, Washington, D. C., scientist and author, stands out: "I say this with all the earnestness and sincerity of a scientist who has spent nearly 20 years' research into the chemistry, biochemistry, physiology, and pathology of fluorine—any person who drinks artificially fluoridated water for a period of 1 year or more will never again be the same person, mentally or physically." Now, if he will only tell us what kind of water will keep us the same, we will at last have discovered the Fountain of Youth. *"Percolation and Runoff," Journal of the American Water Works Association 48:46 November 1956.*

Reaction of gingival tissues to self-curing acrylic restorations

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The reaction of the dental pulp to self-curing resin restorations has been the subject of several studies (for a review of the literature, see Nygaard-Östby[1]). Most of the authors agree that some pulp damage may be attributed to these restorative materials. There is no agreement, however, as to the seriousness of the pathologic condition which develops in the pulp. It is also not yet clear whether a chemical constituent of the resin or its physical properties of shrinkage and thermal expansion are responsible for the pulp damage. Moreover, the demonstration of a poor marginal seal[2-4] with these acrylic fillings tends to place them under the category of "faulty dentistry." A survey of the dental literature revealed no study on the effect of self-curing acrylic resins on the gingiva, except for an occasional report of gingival irritation presumed to be due to such materials.

"Faulty dentistry" is often referred to as a major local factor in the etiology of periodontal disease. In a review of the relation of operative and prosthetic dentistry to periodontal disease, Romine[5] states: "Faulty dentistry is discussed so much that one begins to wonder whether there is any operative dentistry correctly done." The Michigan periodontal workshop[6] reports concerning this problem: "Improper contours, overhanging margins, or roughness of restorations all act as mechanical irritants and facilitate the accumulation of food and bacteria." Waerhaug,[7] in a study of tissue reaction around artificial crowns, comes to the conclusion that heat-cured acrylic resin is well tolerated by the soft tissue, and that a well adapted artificial crown need not cause a pocket to deepen even if it extends as close to the bottom of the clinical pocket as is technically possible. Except for Waerhaug's study, little experimental evidence is available on the reaction of gingival tissues to the materials used in restorative dentistry. What is really the mechanism by which the faults of operative dentistry contribute to periodontal disease? How much of an over-

This investigation was supported by a research grant from the Division of Research Grants and Fellowships of the National Institutes of Health, United States Public Health Service.

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1. Nygaard-Östby, B. Pulp reactions to direct filling resins. J.A.D.A. 50:7 Jan. 1955.

2. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

3. Sausen, R. E.; Armstrong, W. A., and Simon, W. J. Penetration of radiocalcium at margins of acrylic restorations made by compression and noncompression technics. J.A.D.A. 47:636 Dec. 1953.

4. Crawford, W. H., and Larson, J. H. Dental restorative materials: amalgams, acrylics. J. D. Res. 33:414 June 1954.

5. Romine, E. R. Relation of operative and prosthetic dentistry to periodontal disease. J.A.D.A. 44:742 June 1952.

6. Report of evaluating committee II (Periodontal Workshop). Local factors in periodontal disease. J.A.D.A. 45:16 July 1952.

7. Waerhaug, J. Tissue reactions around artificial crowns. J. Periodont. 24:172 July 1953.

hang or roughness starts the chain of events leading to periodontal disease? Can the insertion of restorations produce a deepening of the gingival pocket? In order to find an answer to such questions, it was necessary to conduct a series of experimental investigations. The first of these dealt with self-curing acrylic restorations.

MATERIAL AND METHOD

Twenty-three self-curing resin restorations[8] were placed in 23 teeth of four healthy monkeys and two dogs. The animals were to be sacrificed for other reasons. Cavities of the type illustrated in Figure 1 were prepared on the buccal surface. Deep undercuts were made in the mesial and distal walls by means of a fine tapered fissure bur. The retention in the incisal part was achieved by undercuts there. The preparation was extended to the bottom of the pocket. Any bleeding was stopped by means of epinephrine pellets packed into the cavity.

A stainless steel matrix was contoured to the surface of the tooth in the area of the cavity. This matrix reached from slightly above the gingival margin to the bottom of the pocket. It was kept tightly against the tooth through pressure on the gingiva. Blood and debris were then removed with a stream of water, and the cavity was washed with 70 per cent alcohol and dried.

The resin was applied with the brush-on technic, by painting the cavity with monomer and then placing, with the brush, beads of moistened powder at 30 second intervals until the cavity was filled. The matrix was held in position during the initial polymerization for about 15 minutes. Some restorations were polished one hour after insertion with fine sandpaper disks and rubber cups with pumice; some were left unpolished (see table).

By clinical observation most of the restorations were judged satisfactory, although in some instances "overhangs" and "short" restorations were observed. No attempt was made to correct such fillings so that the tissue reaction to such clinically imperfect restorations might be observed. Some of the teeth with resin restorations were brushed daily during the experimental period. The length of time that these restorations stayed in place are listed in the table.

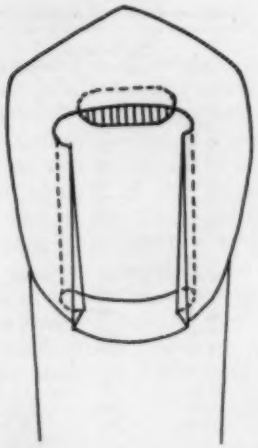

Fig. 1 • Schematic drawing of cavity preparation with incisal and axial wall undercuts for retention

When the animals were sacrificed, the jaws were dissected carefully and fixed in 10 per cent Formalin. Before decalcification the fillings were dissolved in chloroform into which the jaws had been placed. After celloidin embedding, the tissue blocks were sectioned and stained with hematoxylin and eosin for microscopic study.

RESULTS

Clinical examination of the gingival tissues adjacent to the resin restorations revealed no specific changes. Occasionally it was possible to squeeze a puslike fluid

8. Kaden, The L. D. Caulk Co., Milford, Del.

Table • Conditions found in 23 cavities filled with self-curing acrylic resin in experimental animals

Animal	Tooth	Observation period – in days	Polished	Brushed	Width of crevice (mm.)	Downgrowth of epithelium (mm.)	Presence of plaque	Remarks
D 13	UR–4	86	–	–	0.14	0.40	+	Fig. 8
D 14	UL–4	20	–	–	0.04	none	+	
D 14	UL–8	20	–	–	0.05	0.11	+	
D 14	LL–4	13	–	–	0.03	0.12	–	
D 14	LL–9	13	–	–	0.06	0.13	+	Fig. 7
D 17	LL–3	60	–	–	0.06	0.23	+	
D 17	LL–7	60	–	–	0.08	0.16	–	
M 2	LL–4	337	+	+	none	0.45	–	
M 2	LL–5	337	+	+	0.11	0.47	+	
M 4	UL–4	338*	–	+	0.08	0.56	+	
M 4	LR–4	225	+	–	0.03	0.27	+	
M 4	LR–3	225	+	–	0.31	0.34	–	Short restoration, epithelial ingrowth
M 4	LL–3	154	–	+	0.12	0.20	+	
M 4	LL–4	154	–	+	0.07	0.25	–	
M 5	UR–4	216	–	–	0.36	0.25	+	Short restoration, epithelial ingrowth
M 5	UL–4	338	–	+	0.07	0.48	+	Fig. 2 and 6
M 5	LR–4	216	–	–	0.07	0.25	–	
M 5	LL–4	216	–	+	0.03	0.24	–	
M 5	LL–5	216	–	+	0.05	0.23	–	Fig. 3
M 6	UR–4	160	–	–	0.07	0.24	+	Fig. 4 and 5
M 6	LR–4	160	–	–	0.09	0.40	+	
M 6	LL–3	220	+	+	0.02	0.25	+	
M 6	LL–4	220	+	+	0.02	0.23	+	

*Clinically pus secretion.

from the gingival pocket by pressing against the gingiva.

In the histological sections of all the specimens, a severe inflammation, characterized by a heavy accumulation of plasma cells and lymphocytes, was observed (Fig. 2-4). The depth of this cellular infiltration in the gingiva varied from 0.4 mm. (Fig. 3) to 0.56 mm. (Fig. 2). The epithelium was very thin where it was in contact with the resin restorations—sometimes only one or two cell layers (Fig. 3, 5). These cells usually showed signs of degeneration. Epithelial pegs extended deep into the inflamed connective tissue and formed a lacelike network (Fig. 2). This appearance was quite different from that of the epithelial cuff on the lingual side of the same tooth (Fig. 6) or the labial side of control teeth without restorations. Here there was little or no peg formation present, although often a mild inflammatory reaction was found, probably due to calculus formation (Fig. 6).

On 15 of the 23 restorations studied, a plaquelike material was found on the surface of the resin fillings and in contact with the gingival cuff (Fig. 2, 4, 5). However, the gingival reaction was equally severe in instances in which there was no plaque between resin and gingival cuff (Fig. 3, 7).

Another finding was the presence of crevices between the floor of the cavities and the acrylic restorations. These crevices were always filled with debris and plaque material or epithelial cells which had grown into the space between the filling and the cavity floor from the epithelial cuff (Fig. 2, 3, 5). They extended occasionally from the margin of the cavity to the axial wall (Fig. 8). The average width of these crevices varied

from 0.01 mm. to 0.17 mm. with the exception of two instances in which the restorations were obviously "short." There crevices of 0.36 mm. and 0.31 mm. were found (Fig. 2). The downgrowth of the epithelium on the root surface below the cervical margin of the resin restorations averaged 0.27 mm. The deepest downgrowth was 0.56 mm.

Accompanying the poor marginal adaptation and gingival inflammation caused by resin or by plaque formation, a defense reaction of the dental pulp could be seen in many of the specimens (Fig. 4).

DISCUSSION

The observations of marginal percolation[2] and penetration of radiocalcium[3, 4] have shown that self-curing acrylic materials do not seal cavities. If a crevice between the restoration and the tooth is situated adjacent to the gingival cuff, it will soon be filled by a deposit of necrotic tissue.[7] The width of the crevices at the gingival margin of resin restorations is given in the table. Obviously, most of these crevices are too small to be detected clinically with an exploring tine; however, the histological pictures

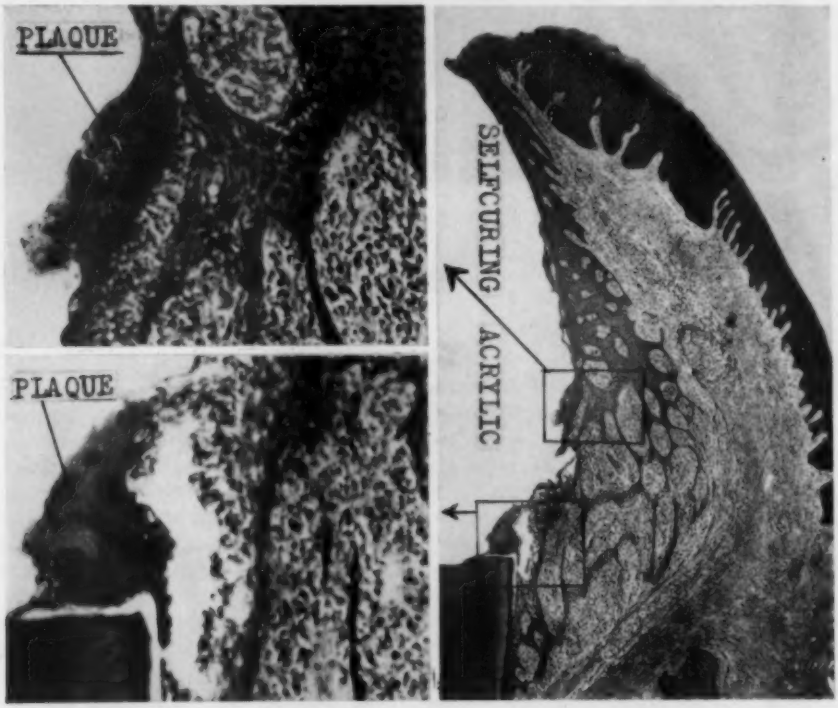

Fig. 2 • Right: UL-4 of Monkey 5. Resin restoration in place for 338 days. Severe inflammatory reaction with epithelial penetration of connective tissue (0.56 mm.). Floor of cavity 1.8 mm. below gingival crest. Plaque formation on resin and in marginal crevice. Upper left: Higher magnification of plaque between resin and gingival cuff. Lower left: Plaque formation in crevice between resin and cavity floor

Fig. 3 • Left: LL-5 of Monkey 5. Resin restoration in place for 216 days. Inflammatory reaction extending 0.4 mm. into gingival connective tissue. Floor of cavity 1.43 mm. below gingival crest. Width of crevice between resin and cavity floor 0.07 mm. Lowest epithelial cell 0.29 mm. below margin of cavity. Right: Higher magnification from area of gingival cuff adjacent to resin restoration

(Fig. 2 and 3-5, 7, 8) reveal their presence clearly because they are filled with a plaquelike material (Fig. 7, 8) and sometimes also with polymorphonuclear leukocytes and epithelium (Fig. 5).

The adaptation of the acrylic filling material to the cavity walls may be so poor that the crevice is not only present at the margin but may extend to the axial cavity wall (Fig. 8). The presence of necrotic tissue and plaque material in these crevices forms a constant source of irritation to the gingival tissue at the margin of the restoration. A response to this irritation may result in an accumulation of inflammatory cells in this area (Fig. 2) and in a deepening of the gingival pocket (Fig. 2, 8).

The finding of plaque on the resin surface (Fig. 2, 4) in 15 of the 23 teeth studied indicates that this also may constitute a source of gingival irritation. Polishing of the resin restoration or brushing of the restored teeth did not influence the frequency of this plaque formation particularly (see table). The reaction of the gingival cuff to the self-curing resin by an extravasation of leukocytes through the epithelium to the resin surface (Fig. 7) is in contrast to the described reaction of the gingival tissues to heat-cured resins.[9] To the latter mate-

9. Waerhaug, J., and Zander, H. A. Implantation of acrylic roots in tooth sockets. Oral Surg., Oral Med. & Oral Path. 9:46 Jan. 1956.

Fig. 4 • UR-4 of Monkey 6. Resin restoration in place for 160 days. Irregular dentin formation in pulp adjacent to dentin tubules leading to resin-filled cavity. Calculus and plaque formation on surface of restoration. Lacelike extensions of epithelium into connective tissue. Severe inflammatory reaction (0.48 mm.) in gingival cuff. Crevice 0.1 mm. wide between restoration and cavity floor. Epithelium on root surface extends 0.24 mm. below cavity margin. Floor of cavity 1.4 mm. below gingival crest

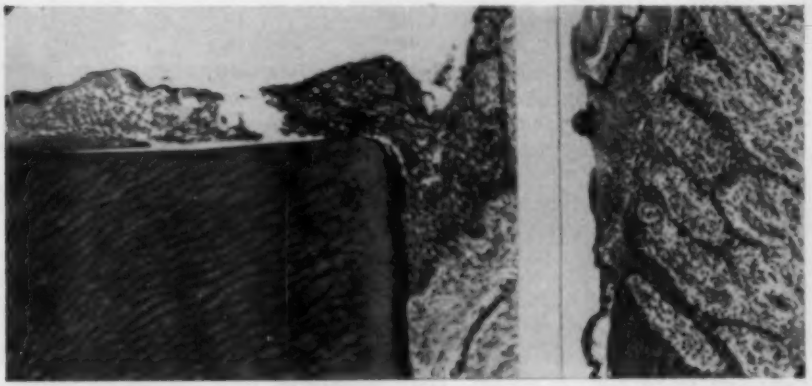

Fig. 5 • Right: Higher magnification of plaque between resin surface and gingival cuff, from Figure 4. Left: Higher magnification of contents of crevice from Figure 4

Fig. 6 • UL-4 of Monkey 5. Lingual gingival cuff. Calculus formation. No restoration. Few inflammatory cells adjacent to epithelial cuff

rials the epithelial cuff often adhered with the formation of a cuticle. Inflammation occurred mainly when plaque formation was present on the heat-cured resins also.

The presence of overhangs (Fig. 7) did not demonstrably alter the described tissue response to resin restorations. This finding is in contrast to the statements[6] that overhanging margins act as mechanical irritants, and that such irritants produce an inflammatory reaction and contribute to periodontal disease. This experimental series shows that the blame for the inflammatory reaction can be attributed to plaque formation in the marginal crevice and on the surface of the restoration as well as to the self-curing resin itself rather than to mechanical irritation.

The question is always raised whether the results of animal experimentation can be interpreted as having the same meaning for man. The results obtained in this investigation on healthy animals, which ordinarily react to calculus on their teeth with gingival recession rather than with periodontal pocket formation, probably indicate a tissue reaction less severe in the animals than may be expected in

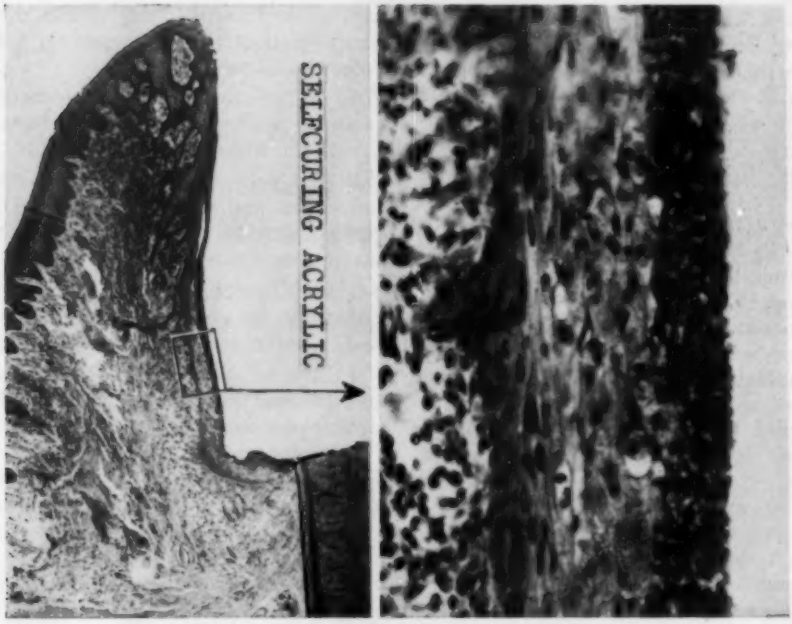

Fig. 7 • Left: LL-9 of Dog 14. Resin restoration in place for 13 days. Overhang 0.3 mm. Floor of cavity 1.9 mm. below gingival crest. Crevice between filling and cavity floor 0.06 mm. Right: Accumulation of leukocytes between epithelium and surface of resin

Fig. 8 • UR-4 of Dog 13. Resin restoration in place for 86 days. Average width of crevice between filling and cavity floor 0.14 mm. Left: Higher magnification of calculus on cementum below margin of restoration. Right: Higher magnification of plaque on axial wall of cavity

man. The presence of crevices and the type of irritation produced by the self-curing resin should be the same in man as in the experimental animals used in this study.

SUMMARY AND CONCLUSIONS

Self-curing resin restorations were placed in 23 teeth of dogs and monkeys. These restorations reached below the gingival margin to the bottom of the clinical pocket. The observation period varied between 13 and 338 days. The technic of dissolving the resin in chloroform before sectioning preserved the soft tissue in relation to the resin in the same way as acid decalcification preserves it in relation to the enamel. Study of the histological sections from this material indicated the following:

1. A self-curing acrylic restoration produces a chronic inflammatory reaction in the adjacent gingival cuff.

2. A crevice exists between the resin restoration and the tooth cavity. This crevice is filled with plaque, necrotic material or epithelium.

3. A plaquelike material is found frequently on the surface of the resin filling and in contact with the pocket epithelium.

4. The conditions listed in observation 1-3 may lead to a deepening of the clinical periodontal pocket.

Josefinegaten 32

Ours Is Not an Age of Science • As I see it, ours is not an age of science. Men are still driven by greed and confused by guile, rather than guided by reason based on our expanding knowledge. Science has greatly enlarged man's understanding, conquered many of his diseases, lengthened his life, multiplied his joys, decreased his fears, and added much to his physical comforts and powers. But man may and does use these and other achievements for a greater social injury, instead of for a further social advance. Science is specifically human, in that it stems from the innate curiosity of all men, and the conspicuously plastic brains of the ablest, if not the noblest, of our fellows. If this be so, it follows that the scientific method and its products cannot be, in any fundamental and permanent sense, in conflict with human nature, though our present human society, a product of the past, dominated by greed, force and fear, may be and is in conflict with the scientific method. Whether science and the scientific method, whether understanding, honesty, reason and justice can contrive survival values equal, if not superior to the blind forces of nature which shaped man's past, is as yet in the laps of the gods. Still, we cannot deny the possibility, and we will nurse the hope that the hairy ape who somehow lost his tail, grew a brain worth having, built speech and song out of a hiss and a roar, and stepped out of the cave to explore and master the universe, may some day conquer his own irrational and myopic behavior towards his kin.—*Anton J. Carlson, Science Versus Life, 1955.*

Lower denture technic based on a proper understanding of the accessory muscles of mastication

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The art and science of designing, constructing and placing successful complete lower dentures must be based on a proper appreciation of the importance of applied anatomy, applied physics, applied physiology and certainly applied psychology.

In an effort to understand the location and action of the muscles involved in lower denture technic, a number of approaches were made as follows: Many dissections were made, and the muscles were painted varying colors in oil paint (Fig. 1 and 2). In one dissection the facial muscles were patterned in paper, then outlined in stovepipe wire from the paper pattern. The wire outlines were then assembled and brazed in the proper relation to each other. The muscles were stripped off and the wire outlines were substituted; it was thus possible to look through the muscles to see the underlying tissues.

Muscle action was demonstrated by vestibule impressions of the mouth, some made with the muscles tensed, others with the muscles taut (stretched).

Many feet of slow-motion film were made of faces during the mastication cycle. These films disclosed that the movement of the lips and their associated muscles were essentially ones of protrusion and retrusion, thus feeding the food into the masticatory apparatus and holding it there just as the tongue does on the lingual aspect of the teeth.

To find the tongue movements necessary to form properly the lingual periphery of the impression, it was necessary to suture steel bands to the palatoglossal muscle at the level of the gingival border of the lower third molar (Fig. 3-6). Beads were also laid on the dorsum of the tongue. Then the tongue was moved to four successive positions, and a roentgenographic headplate was made of each position. The varying positions of the mylohyoid muscle were disclosed by the varying positions of the hyoid bone. The varying positions of the palatoglossal beads in relation to tongue movements helped to determine how to mold correctly the impression in that region.

In an effort to find a simple method for locating the height of the occlusal plane, a vestibular impression was taken in the cheek with the lips forcibly protruded (Fig. 7). It was found that the center of the bottom of the groove cut by the horizontal fibers of the buccinator muscle coincided with the occlusal plane of a natural dentition. Repeated checking confirmed this fact.

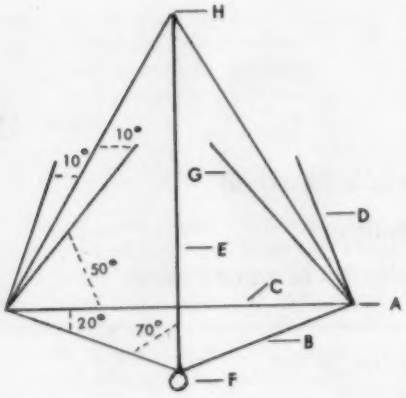

Fig. 1 • Pattern of facial muscles

A, head of condyloid process
B, line through axis of head of condyloid process
C, line through heads of condyloid process at right angle to median line
D, upper head of external pterygoid muscle. It is attached to interarticular cartilage through capsular ligament
E, median line
F, foramen magnum
G, middle and lower heads of external pterygoid muscle. They are attached to head and neck of condyloid process
H, incisal foramen. Note that D is at right angle to B

To relate the occlusal plane to a facial line, a flexible wire was bent to conform to the facial contour from the center of the alae of the nose to the center of the tragus of the ear as denoted by the point of tissue projecting distally. The wire was taped to place (Fig. 8). A flattened cylinder of foil was laid on the occlusal surfaces of the lower teeth, and the teeth were then occluded with the foil in place. A roentgenographic headplate was then taken and a full sized roentgenogram made and backed by a thin sheet of balsa wood. The ear and one half of the nose were molded in acrylic resin and mounted in the correct place on the print.

On angulation it was found that the foil cylinder (the occlusal plane) was parallel to a line from the lower border of the alae of the nose to a point just above the center of the tragus of the ear. Repeated checking confirmed the center of the tragus of the ear as the average position for the distal end of the facial line.

In denture construction, two sets of muscles are being dealt with: (1) the power or jaw-activating ones and (2) those that "feed the mill," which for want of a more suitable name can be referred to as the accessory muscles of mastication (Fig. 9). Their chief concern for dentists arises from the fact that they can be tensed or drawn taut (stretched) without regard to jaw relationships. Fish[1] has stated that these latter muscles should be used to gain denture stability by registration of their actions, not only on the impression borders but also on those surfaces of the impression that will be represented on the finished denture by the polished surfaces. Many clinicians habitually use only the action of taut (stretched) muscles, such as in tongue protrusion and face pulling, rather than tensed muscles.

The success of a lower denture should be considered in terms of utility, cosmetic effect, maintenance of the ridge and the ease with which a patient can accustom himself or herself to it. It frequently may be possible to get excellent stability, approaching or even exceeding that of an upper denture, but to make stability the only goal very frequently leads to the error of overextension and distortion, correction of which by the dentist or by tissue reaction results in a great deal of disappointment.

EXAMINATION

It was stated previously that a careful mouth examination was a prerequisite for a successful denture. The following are examined and noted on the chart:

1. Fish, E. W. Using the muscles to stabilize the full lower denture. J.A.D.A. 20:2163 Dec. 1933.

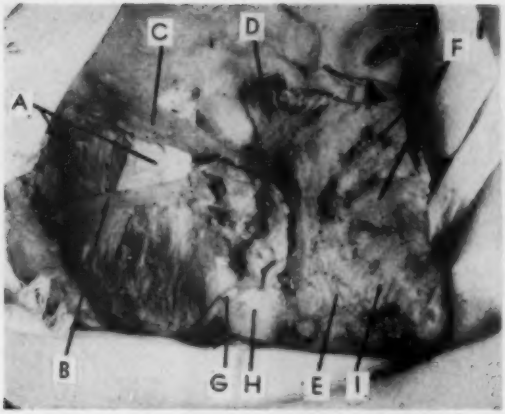

Fig. 2 • Muscles on right side of face. A, masseter muscles. B, Stensen's duct. C, zygomatic muscle. D, canine muscle. E, triangular muscle. F, orbicularis oris muscle. G, facial artery. H, bare mandible. I, quadratus labii inferioris muscle

1. The size of the oral vestibule and the tone of the lip muscles are noted. If small and of high tone, a definite rest must be provided at the labiogingival surface of the anterior teeth for the lip. Also, the bicuspids must be set in well on the ridge, and their occlusal surfaces must have a definite lingual inclination. The molars, of course, are always set with their buccal wall sloped lingually from the gingival to the occlusal surface to facilitate the sweeping of the food upward to the occlusal surface by the horizontal fibers of the buccinator muscle.

2. The amount of saliva is noted. If it is excessive, steps may be taken to control it during impression-taking. If the saliva is scanty, proper medical treatment may be instituted to restore it to normal, since successful dentures demand proper mouth lubrication. Should the saliva be excessive or ropy, a gargle of a suitably flavored detergent may be used

Fig. 3 • View of tongue in rest position. Fourteen millimeter beads are shown down and back of third molar. Note and compare positions of hyoid bone (mouth floor) in Figure 3, 4, 5 and 6

Fig. 4 • View in which tongue is protruded. Nine millimeter beads show down and back of third molar

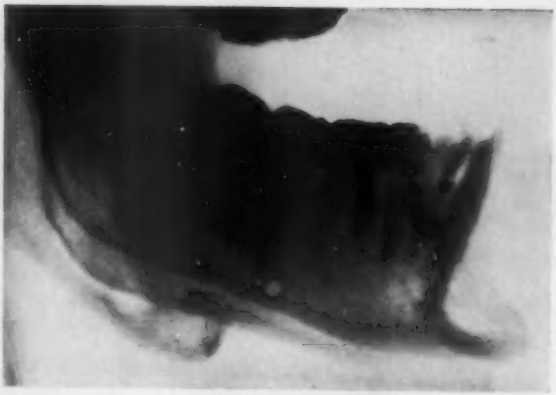

Fig. 5 • View in which tongue is pressed hard against posterior palate. Eight millimeter beads are shown up and back of third molar

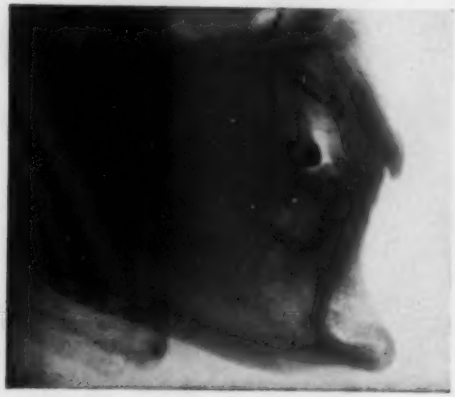

Fig. 6 • Tongue forced firmly against lower anterior teeth. Only five millimeter beads show back and down from third molar

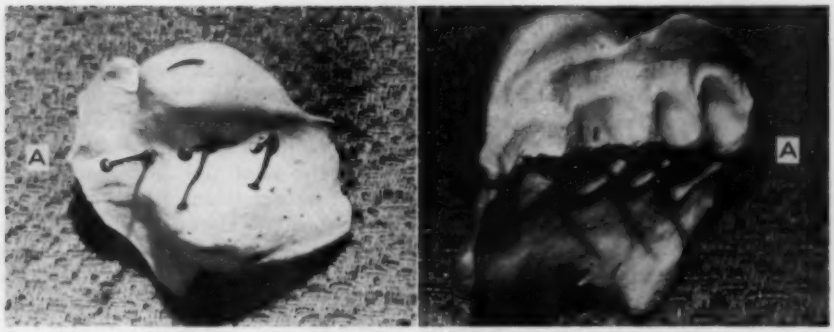

Fig. 7 • Left: Pins perforating center of bottom of groove cut into vestibular impression by taut, not tensed, horizontal fibers of buccinator muscle (lips protruded). Right: Reverse side of impression. A, anterior

to clear the mouth just before making the impression, or sweetened table vinegar (approximately 6 per cent acetic acid) may be used. On the other hand, a dry mouth will suggest a check for thyroid disturbance or a tendency to achlorhydria.

3. Tenseness of the floor of the mouth overlying the sublingual gland is noted as a guide to allowable pressure.

4. The size of the tongue is of interest. If the tongue is small, frequently a tongue rest can be provided by flaring the denture periphery well toward the tongue in the region superficial to the sublingual gland (the tray impression should show if this is possible). These tongue rests are possibly the most efficient stabilizers of lower dentures, even when added to old dentures. If the tongue

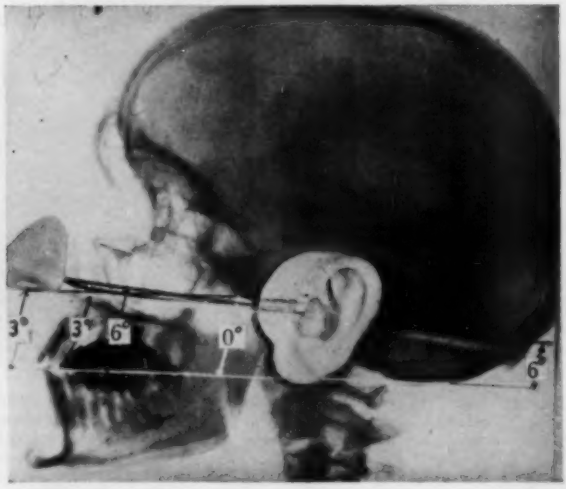

Fig. 8 • Roentgen ray headplate. Note degrees of convergence of lines. Only line from bottom of alae of nose to a point 2 mm. above center of tragus of ear is parallel to line of occlusion

is large, the teeth frequently must be well narrowed to provide tongue space.

5. If the sublingual salivary gland overlies the crest of the ridge, this is noted so that it can be taken care of at impression-taking time.

6. Sharp spines, thin ridge crests, prominent pseudomylohyoid ridge areas and tendinous and flabby ridges are noted so that suitable tray relief and tray perforations may be made as necessary. Occasionally it may be wise to treat some of these conditions surgically. If this is done, however, subsequent failure to place a satisfactory lower denture may cause the patient to question the dentist's judgment in having, as they think, cut away a good ridge and left them with little or none. Other means, such as tray perforations to relieve pressure, are often preferable.

7. Abnormal tissue attachments should be corrected or noted.

Not only should the mouth conditions be noted, but they should be discussed with the patient. This procedure will impress the patient with the thoroughness of the dentist and lay a basis for confidence. It also will guarantee greater cooperation after the denture has been placed; then the dentist has a reason, not an excuse, for special adjustments that may be required in any area.

It has been my practice for some years, at the first consultation, to give each prospective denture patient a folder on which is printed a frank discussion of what they may face in the way of tissue change and difficulties in learning to wear a denture. This folder is in addition to one given to the patient when the

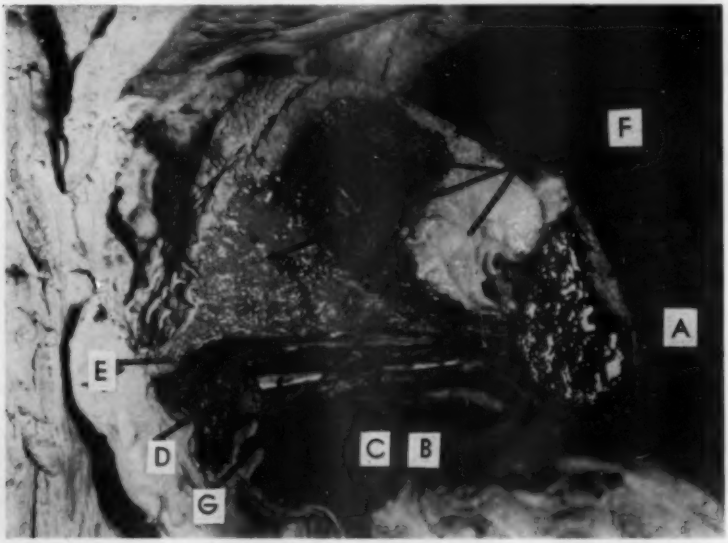

Fig. 9 • Left side of mandible, sectioned at symphysis. A, mandible. B, mylohyoid muscle. C, geniohyoid muscle. D, hyoid bone. E, some of posterior (superior) fibers of genioglossus (geniohyoglossus) muscles attached to hyoid bone. F, three divisions of tongue. Note attachment of anterior fibers to mandible. G, cardboard inserted between hyoid muscles

denture is inserted. It has solved the reline and rebase fee problem, and proved its worth in many other ways. It is necessary to prepare the mind as well as the mouth for dentures. The material given in the folder follows:

SOME FACTS OF INTEREST
TO PROSPECTIVE WEARERS
OF DENTURES

In view of the fact that you are considering the substitution of artificial for your natural teeth, it would be advisable to consider what this transition may mean to you, and how best you can approach the situation to get the best satisfaction from artificial substitutes.

Mouths vary with each patient, and the patient's attitude toward dentures also varies greatly. It has been said that denture work for its success depends 50 per cent on the dentist and 50 per cent on the patient, but in some instances where special difficulties in the shape of mouth and tissue abnormalities are present, it frequently is found that 75 per cent of the success depends on the patient's proper understanding and cooperation. The dentist must accept, for the most part, abnormal conditions as they are, and make the best of them.

Dentures are simply mechanical apparatus, that, thanks to science, have been carried far toward the ideal in many ways and yet as with all mechanisms their operation and habit of usage must be mastered if success is expected.

There are many faults still to be overcome in the present manner of restoring these lost organs. When dentures are first worn, they will seat themselves slowly into place. This usually will mean that certain spots will chafe, especially on the borders, so that for the first week or ten days, frequent adjustments may be necessary. Speech and taste also are affected temporarily to varying degrees.

When natural teeth are not replaced soon after extraction, the tongue, having more space, seems to enlarge, so that the dentures inserted in these mouths will at first seem too bulky. However, a month or two will correct this, unless the teeth, especially the lower, have been out for a long time. In this instance more patience is necessary on the part of the wearer of the dentures. Then too, there is the constant change in the bony tissue in the base on which the denture rests. This, of course, varies with the individual; usually it is continuous for life, so that for proper denture service the dentures should be checked at least yearly and tissue changes taken care of by relining the dentures, or by other appropriate means. The expense of this service is nominal, but it means a properly fitting, more comfortable and more satisfactory denture. Sometimes the change in the bone is so great that new dentures are required every few years if an aged look is to be prevented.

When no teeth have been worn for a time, the sudden distention of the lips and cheeks by the insertion of new dentures, even though restoring the expression as before the loss of the natural teeth, will seem to cause distortion, but frequent gentle lip massage will correct this. Also during this time the muscles and other tissues of the cheek slowly mold themselves to the dentures and considerably increase the stability, especially in the lower denture.

When the teeth are extracted, the bony walls of the sockets are absorbed in varying degrees and with varying rapidity. Most of this absorption takes place during the first three months if no artificial substitutes are provided, but where dentures are provided earlier, they act as a splint and lessen the rate of absorption, extending it often to a year.

Frequently a request is made for the immediate replacement of lost teeth. In this instance the dentist may try to anticipate the natural bone absorption by trimming back the bony socket wall where he extracts the teeth. This must, of course, be only guesswork. Further absorption is almost certain to ensue. The dentures will then be loose and need to be remade to some degree in a few months; in a year, a whole new denture is usually required.

For many years a profile wire (16 English gauge) has been fashioned for each denture patient. This carries a record of the incisal edges of both upper and lower teeth in centric occlusion, and the lower incisal edges at rest position. This practice has evolved until now the profile record is taped to a balsa wood paddle (⅛ inch thickness), which is placed in an envelope with an appropriate note to the patient and an explanatory note for the dentist. The balsa wood also has a detachable cast of the three upper and the three lower anterior teeth, right side, articulated and in natural relation to the lips. The cast of the left side of the anterior part of the mouth can be fitted to the right side when it is removed from the balsa paddle, thus

giving a full cast of the six upper and lower anterior teeth, or a one piece cast of the upper and lower anterior teeth can be made.

When the denture is completed, the patient is given the record to keep. This procedure ensures that the record will not be lost should the office be discontinued in later years. To extract all the teeth without first procuring some such record is almost criminal neglect. It will simplify denture construction and help avoid the symptoms of Costen's syndrome.

IMPRESSION TECHNIC

It has come to be generally recognized that each patient requires a special tray, so it is necessary to take an impression to make one.

Any impression material can be used, but it must satisfy certain physical requirements. It must not overextend or overcompress or distort any tissue. It must flow readily. It has often been stated that oral tissue cannot be compressed, but, after all, oral tissue contains more or less fluid that can be expressed by pressure, so it would be quite reasonable to say that tissue compression is indeed possible.

Plaster varied in plasticity for the needs of the individual case is the impression material used. A rather shallow stock tray is selected, bent up at the heels to conform to the ascending ramus, but not long enough to ascend the ramus and cover the buccinator muscle. It should not be so wide as to distend the cheeks or interfere with freedom of tongue movements. The handle must be bent up and out to allow free lip movement. Finger rests at least 1 cm. high are placed on the tray in the first molar region; a section of stick compound will suffice. This will prevent distortion by the fingertips on the buccal and lingual surfaces of the ridge.

The patient is now carefully instructed in lip, cheek and tongue movements as follows:

The tongue movements are made by pushing the tongue tip forward into the V made by the forefingers holding the tray and maintaining it thus until the impression is ready to be removed. The lip and cheek movements consist of an extreme protrusion and retrusion of the lips as in sounding "proo-wiss," the "wiss" movements being amplified to retract the corners of the mouth as far as possible. When it is certain that the patient can cooperate, the next step can be taken, but it must be certain that he can, and will, protrude and retrude the lips satisfactorily, and hold the tongue in proper position. This is most important.

Relief areas (which include sharp ridges) are located and marked with a dull indelible pencil. The protruded tongue is pushed aside with a mirror or tongue depressor, and the line of deflection of the mucosa from the mandible to the tongue in the areas corresponding to the lingual heels of the denture is marked as an approximate guide for length.

The line on each side on which the horizontal fibers of the buccinator muscle cross the ascending ramus is located, and below this a mark is made with an indelible pencil. To locate this line, the patient draws each corner of the mouth well back, with mouth wide open (Fig. 10).

Plaster without an accelerator is mixed to a consistency suitable to the muscle tone. The plaster must be thin enough. The tray is loaded, then a small amount of plaster is spooned quickly into the lateral tongue space from as far back on one side as is possible to a like spot on the other side. An excessive amount should not be used, but it is necessary to fill in as far back as possible; this may be done with the fingertip when the patient's tongue is protruded. This spooning in of plaster will depress the sub-

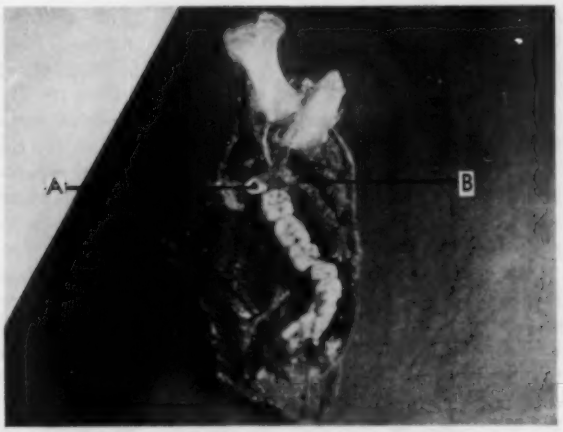

Fig. 10 • Left side of mandible. A, pterygomandibular raphe. B, sectioned horizontal fibers of buccinator muscle

lingual gland if it overlies the flat ridge; but chiefly, it will give a full impression of the lingual heel area. In some instances, the buccal heels must be treated likewise where a flabby buccinator muscle overlies the area.

The flat tray loaded with plaster is now quickly inserted and rotated to place, and while it is lightly held in place by the forefingers placed on the tray rests, the "proo-wiss" motions are repeated a number of times to mold the labial and buccal areas.

To mold the lingual area, the tongue tip is protruded to the vermilion border. The patient should not use any swallowing movements as there is an excess of plaster in the mouth because of an ill fitting tray (stock tray). While the plaster is setting, the tongue is kept fixed in its position and the corners of the mouth held retruded. Any movement will tend to fracture thin buccal and labial edges and result in indistinct outlines on the lingual surface. For this reason, there must not be any lip or tongue movement.

When well set, the impression is removed, washed off under the tap and dried, and if fractured, repaired (Fig. 11, left). The relief areas as outlined by the indelible pencil are relieved to the desired depth by scraping. The lingual heels and ascending rami of the impression, where marked by indelible pencil, are scratched so that they will transfer to the cast and assist in deciding the approximate tray heel length. When the impression shows a knife-edged ridge, not only is the crest of the ridge well relieved, but the whole ridge groove in the impression is well widened to provide a proper flow-way space in the tray that will be made subsequently.

The impression is poured and a tray fashioned. For some years shims were used under the tray to provide flow-way space for the impression material, but these produced pressure spots. Later, a double tray technic was used; now a tray of heat-curing acrylic dough that can be rolled out to the desired thickness is fashioned. Vertical walls are the only ones needing added flow-way space, and this is mostly on the lingual aspect, so a core of wet asbestos sheet of proper thickness is laid on the lingual surface of the cast extending to the ridge crest. The acrylic dough is fashioned into a tray over this core and trimmed as outlined on the cast. The buccal and the labial surfaces are well shortened. The handle must allow free lip movement, so it is

made vertical for at least 1.5 cm. and then labial for another 1.5 cm. and concave on the lingual surface.

After the impression tray is checked in the mouth, the buccal and labial flanges of the tray are trimmed short. The whole peripheral border of the tray is now beveled, at the expense of the inside edge, to add thickness to the impression on all borders.

The tray is now complete except that it is only approximately accurate on the distolingual aspects of both its right and left sides, as they have been trimmed to the scribed line. It was demonstrated by the use of the steel beads that forcing the retruded tongue against the lingual aspect of the lower incisors would assist in this matter, so low heat compound is applied to both lingual heels of the tray from ridge crest to the first molar area lingually. The tongue is forced firmly against the concaved tray handle while the tray is held in place. One side is checked at a time. The tray is trimmed as necessary, and the procedure is repeated until the tray is satisfactory (Fig. 11, right).

If there is a prominent flattened crest with a lingual inclination in the molar region (Fig. 12) that simulates the mylohyoid ridge and too often is mistaken for it, a thin ridge crest, some more or less sharp spines, or a flabby or tendinous ridge, that will not be corrected surgically, special means is taken to effect relief. Holes are bored through the tray in suitable number in size; usually a no. 4 to 6 bur is used. The perforations are made from the lingual aspect of the tray to the bottom of the groove in the tray. The bur should not be too large nor should there be too many perforations.

Compound finger rests are now added to the back of the tray in the first molar region, or tray material may be used when the tray is fashioned. The height of these rests will depend on the height of the ridge; flat ridges demand at least 1 cm. If rests are not used, the finger resting on the tray will maintain a lingual or buccal bulge of plaster that will not mold properly and thus will distort the impression.

The required muscle movements are demonstrated, and the patient is again instructed as before, except the posterior

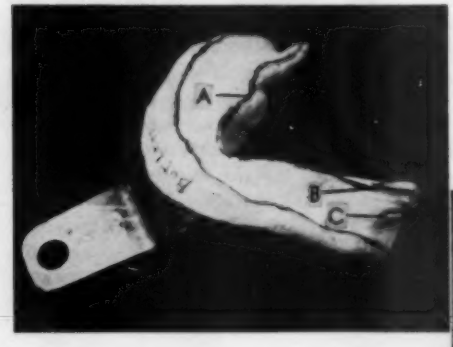

Fig. 11 • Left: Impression to make special acrylic tray for lower denture. A, tongue rest. B, groove cut by mylohyoid muscle. C, groove cut by lower fibers of superior constrictor muscle of pharynx. These are inserted into mandible at posterior end of mylohyoid ridge

Right: Stick compound traced on heels of special tray molded by muscle action

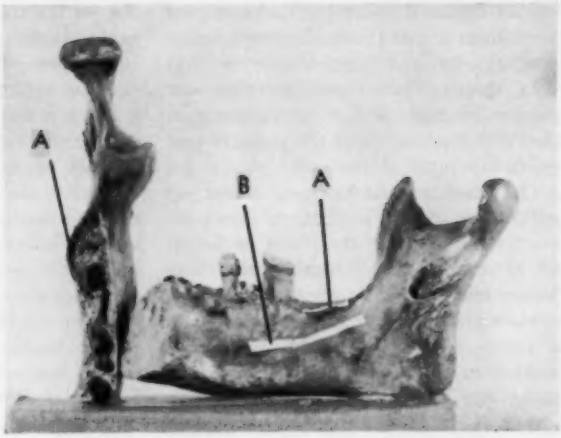

Fig. 12 • A, pseudomylohyoid ridge. B, mylohyoid ridge

part of the dorsum of the tongue is also to be forced against the palate as in pronouncing "hush" or as in the second part of the first stage of swallowing. The patient, however, must not complete this action even now. The dentist must be sure that the patient understands and will cooperate.

Plaster without an accelerator is mixed to the consistency required; it must be made certain that it is thin enough. The tray is loaded sparingly, then quickly inserted and gently rotated to place with light pressure on the finger rests. The mouth must be freed of saliva before the tray is inserted; occasionally atropine may be necessary to prevent excess saliva.

The tray is held in place with the forefingers on the rests while the patient registers proper muscle movements. The patient is often assisted by the operator's demonstrating the lip and cheek movements. The "proo-wiss" motions having been repeated at least four or five times, the lips should come to rest in the retruded position. The tongue tip is first protruded to the vermilion border to carry out the excess plaster, then the posterior part of the dorsum of the tongue is pressed against the posterior part of the palate. The tongue then is held gently against the concaved tray handle until the plaster has set. No tongue or other muscle movements should be made while the plaster is setting; this, as before suggested, would either fracture the margins of the impression or leave them irregular and indefinite.

When the plaster is well set, the tray is gently removed by raising the handle, pushing backwards and then raising the heels. The cast is then poured.

The cast as now completed is a replica of the oral tissue undistorted and under equalized pressure, and the areas exhibiting poor stress-bearing surfaces have been relieved. The peripheral border for the denture has been demarked by the accessory oral muscles of mastication and deglutition in their normal working range of movements. Not only have the peripheral borders for the denture been established, but the whole buccal and labial region of the impression has been muscle molded.

CONSTRUCTION OF DENTURE

The bite blocks are now prepared, contours built out and the vertical dimension established. The centric relation is established by the method of choice. The

occlusal plane is made parallel with the facial line as previously discussed, using foot-long straight edges made of thin balsa wood. These straight edges are also used to make the occlusal plane parallel with the line from the pupil of one eye to the pupil of the other eye.

The level of the occlusal plane, as before indicated, must bear a direct relation to the level of the plane on which the taut horizontal fibers of the buccinator muscle act. To check this matter, a vestibule impression is taken, both sides at once, using soft plaster with wax biterims in place. The lips are held protruded forcibly while the plaster sets. The bottom of the groove cut in the soft plaster by the buccinator muscle will be the correct height of the line of occlusion. Small holes drilled through the plaster into the wax at the bottom of the buccinator groove can be used to help correct any error.

The biterims are fused in centric position and the median line is marked. The biterims are placed on their casts and mounted on the articulator with the incisal guide pin in place. The occlusal curves are established by a modification of the Myers' technic. If the patient is edentulous, the following method is used:

About 3 mm. in depth of wax is removed from both biterims at corresponding locations on the upper and lower biterims, leaving a length of about 5 mm. of the hard wax in only the second molar area and the area between the lateral incisors intact. The hard wax is replaced by a soft wax overfill faced with aluminum foil. The articulator is closed and squeezed until the guide pin lacks about 4 mm. of coming to rest.

The wax rims are then held occlusal surfaces down in a pan of warm water (120°) for half a minute to equalize the softening of the soft wax. They are placed in the mouth and the patient alternately registers a right and then a left lateral bite, and then protrusive position. The biterims must not slide in contact until the curves have been fairly well established, or the curves will be wrecked.

The jaw excursions are continued until the curves are satisfactory and the hard wax stops are in contact. If on a lateral swing, the hard wax bases are not in contact at the heels, the heels of the lower rim are raised by adding hard wax to the hard wax in the lower rim in the second molar region and relieving the hard wax in the upper rim an equal amount. The rims then are placed back on their casts on the articulator.

The whole upper occlusal wax surface is cut away to a depth of at least 5 mm., and in its place (with guide pin in position) an opposing cast is poured in stone against the lower biterim with its curves. These same steps in technic are used when partial lower dentures are articulated against complete upper dentures, and also for partial upper dentures where the molars and bicuspids are to articulate with partial lower dentures replacing molars and bicuspids. It is a most satisfying solution for the problem of balance.

The lower teeth are set over the ridge against this upper stone curve. The cusps are flattened to suit. The upper teeth are set to occlude with the lower.

Acrylic teeth lend themselves readily to reshaping and polishing, but they seem dull to the patient. Considerable more stress on them, therefore, is necessary for mastication; this often results in tissue soreness. An overjet, if called for, should not be avoided, but very little overbite should be allowed.

In the incisor area a lip rest varying in size can be devised that will add considerably to stability, especially where the vestibule is small. This is accomplished by setting the gingival margins of the teeth in well, thus avoiding the vertical or convex labial wall so often evident in lower dentures.

Frequently, in the past, otherwise stable dentures were failures because of incorrect peripheral outlines in the re-

gion of the sublingual glands. It is well to remember that the denture base frequently may be flared well toward the tongue and so provide another stabilizing factor.

The molars must never overhang the tongue. The lingual wall of the denture should be inclined upward and inward. The teeth, of course, are kept in balancing relation to the ridge. Cusp interference is avoided by using low-cusp teeth, but in every instance food escape gates must be provided on the occlusal surfaces. Where the ridge has a poor stress-bearing surface, the load on it should be lessened by narrowing the molars buccolingually. Where the ridge slopes downward considerably from the heels forward, it frequently is necessary to leave off the second molars to avoid a saucering up of the anterior part of the denture.

The necessity for greater attention to labial and buccal contours is being recognized more fully year by year. A technic to solve this problem and another is quite simple. For some time two steps were taken at this juncture, before finishing the restoration; one was to give proper buccal and labial contour to the denture and the other was to correct a frequent cause for chafing and poorly fitting flat lower dentures. It was recognized that it was impossible to know whether or not a flat lower restoration at the try-in stage had tipped up, down, or shifted a bit to occlude properly with the upper teeth on closure. It is now concluded that frequently, when the denture was completed and the upper and lower teeth occluded, a slight shifting or tipping occurred which produced chafing and a poor fit.

Now, at the try-in stage, the procedure is as follows: The relief areas, whether they are hard areas, spines or knife-edged ridges, are located by indelible pencil marks and relieved. Wax, approximately the thickness of one sheet of wax, is removed from the labial and buccal portion of the set-up, and the surface is roughened well. Then the lingual, occlusal, labial and buccal surfaces of the teeth that are to be exposed in the finished denture are coated with liquid petroleum jelly. A free and smooth flowing zinc oxide paste is spread on the bearing surface, using a small excess that can flow to the buccal and the labial margins.

The appliance is then placed in the mouth and the patient closes the jaw in centric position. The "proo-wiss" movements are made forcibly a number of times, while the tongue is pressed gently against the lower anterior teeth. When set, the excess zinc oxide paste is removed and cut away, and the gingival portion is carved, using the muscle-molded surface as a guide for contour. The occlusion is adjusted as required.

After the dentures have been worn for at least ten days, the final grinding is done in the mouth, using emery powder no. 120 mixed with water and denture adhesive powder.

Most ridge crests need some relief; how much depends on muscle tone, the character of the ridge and the plasticity of the impression medium. Narrowing the occlusal surfaces and milling in is sometimes considered the cure-all, but a careful examination and a thoughtful diagnosis is necessary.

Greater stability for a complete lower denture may be attained by the patient's being educated to maintain a forward position for the tongue rather than a retruded one. This should be demonstrated to the patient. After the placing of the dentures, definite appointments should be arranged, gradually extending the time between the visits. The patient then realizes that the dentist expects the dentures to need adjustments from time to time, usually for at least a month, sometimes for a longer period.

It is necessary to diagnose not only the mouth, but the patient as well. To the dentist, the denture is but one more

denture; to the patient, it is the most important denture ever made, so the dentist should act accordingly. The following instruction folder is furnished to each patient when the dentures are inserted, as it is felt that some such instruction is necessary.

INSTRUCTIONS IN WEARING DENTURES

You are now to use substitutes for natural organs, and however perfect they may be, they are not equal to the natural teeth, nor are they used in quite the same way.

These instructions will assist you in a great measure, but do not expect to acquire facility in the use of these new substitutes at once. That comes only by patience, practice and time. You will learn a little at a time, day by day, gradually acquiring skill and command over them. In a month or two you should acquire a considerable degree of skill. All others who wear dentures have to go through this process of education. The dentist may do his part perfectly, but this is something you have to do for yourself. No one can do it for you; unless you do it yourself, your teeth will not be a success.

Great care has been exercised to make these dentures fit accurately, but because the mouth has hard and soft areas, more or less adjustment and attention is necessary for the first week or so while they seat themselves into place. They are stabilized, or held in place by two things: first, by the proper fit to the tissues; second, by the proper meshing of the upper teeth with the lower, so that in grinding food the two dentures support each other.

The lower teeth are often rather troublesome, more so than the upper, since the lower jaw very frequently has only a flat ridge to set the teeth on and there is thus little to hold them in place.

You should not allow yourself to get in the habit of leaving the dentures out. To do so is a distinct loss, for no one ever learned to use a set of dentures by leaving them in the bureau drawer. You can learn to use them only as a child does walking—by walking, even though imperfectly at first.

In speaking, there are certain sounds that are apt to be more difficult than others: S, X, Ch and Sh are the worst. To overcome this, practice reading aloud and do it alone. When you meet with a word that bothers you, stop and say it over again until you can say it distinctly. Remember that you have to train the muscles as a child has to do in learning to talk.

Learning to eat with them will take somewhat longer, but the principle is just the same. Don't expect to eat your first meal with your new teeth as you did with your natural teeth, or as someone who has worn dentures for a number of years, for you won't do it. No one does. In fact, you had better get used to the feel of them for a few days before you try to eat with them. Only an exceptional patient can use these new dentures to chew any of their food for the first day or two; but after that period, the use of the dentures should be increased at each meal. Eat slowly. In a few days more, with increased confidence and control which comes with practice the whole meal can be essayed.

In biting on a hard substance, like an apple, an ear of corn or a crust of bread, press it upward against the upper teeth; this is good advice on taking anything into the mouth.

If a sore spot arises, come into the office at once while the sore spot is showing, not after it gets well.

Will you keep your teeth in at night? Yes, at least until you are used to them; after that, suit yourself.

Your dentures are made of special material and it is advisable to keep them in water when not in the mouth.

For cleaning, use a stiff hand brush with soap and water, brushing all surfaces. It is advisable to brush over a basin of water to avoid damage in case the dentures slip from the hand.

613 Medical Arts Building

On Recreation • Nothing reveals the true silhouette of a person's soul better than his favorite pastime. . . . What distinguishes one person from another is not their occupation but the highly individualized repertory of activities they choose in their leisure time. ***Félix Martí-Ibáñez, Books in the Physician's Life.***

Report on dental findings in Newark, Delaware, children after five years of fluoridation

Paul Musselman, D.D.S., Newark, Del.

Studies made of children between the ages of six and ten who drank fluoridated water for five years showed a reduction of 32.1 per cent in the DMF (decayed, missing or filled) rate for permanent teeth. The study was based on dental findings from 347 children examined in October 1950, just prior to fluoridation of the public water supply, and 302 children examined in October and November of 1955. The latter group included only those living in Newark, Del., during the first year of fluoridation. Those in both groups were students in Central and West Park Schools.

As noted in Table 1, the DMF rate per child in 1950 increased from 1.1 at six years of age to 4.9 at ten years; whereas in 1955, the rate for six year olds was much lower—0.2 progressing to 3.4 at ten years of age.

In Table 2 is noted the observations with regard to children who had caries-free permanent teeth. Again, among the six year old children who were the youngest of the group when fluoridation started, the contrast was most noticeable, indicating they received the greatest benefits. In 1955, five years after fluoridation, 88.8 per cent of the six year olds had caries-free permanent teeth as compared with 54.8 per cent in 1950, an over-all increase of 62 per cent. Of the 302 children examined in 1955, the percentage of children with caries-free permanent teeth was 34.4 as compared with 21.3 for the 347 children examined in 1950, an over-all increase of 61.4 per cent.

Table 1 • Comparison of dental caries prevalence rates in permanent teeth of children in continuous residence in Newark, Delaware before fluoridation and after five years of fluoridation

	1950—Before fluoridation			1955—Five years after fluoridation*			
Age†	Number of children examined	Number of DMF* teeth‡	DMF* rate per child	Number of children examined	Number of DMF teeth	DMF rate per child	Per cent reduction in DMF teeth
6	73	82	1.1	45	9	0.2	81.8
7	88	204	2.3	69	76	1.1	56.0
8	70	201	2.9	73	125	1.7	31.5
9	63	234	3.7	53	146	2.8	24.3
10	53	260	4.9	62	212	3.4	30.6
Total	347	981	2.8	302	568	1.9	32.1

*Fluoridation initiated in Newark, Del., in October 1950.
†Age at last birthday used at time of examination.
‡DMF includes decayed, missing, or filled permanent teeth.

Table 2 • Number and percentage of children with caries-free permanent teeth in 1950 before fluoridation and in 1955 after 5 years of fluoridation

	1950—Before fluoridation			1955—Five years after fluoridation*			
Age†	Number of children examined	Number of children with caries-free permanent teeth	Percentage of children with caries-free permanent teeth	Number of children examined	Number of children with caries-free permanent teeth	Percentage of children with caries-free permanent teeth	Percentage increase children with caries-free permanent teeth
6	73	40	54.8	45	40	88.8	+ 62
7	88	20	22.7	69	31	44.9	+ 97.9
8	70	6	8.6	73	23	31.5	+266.3
9	63	3	4.8	53	6	11.3	+135.4
10	53	4	7.5	62	4	6.4	− 17.2
Total	347	73	21.3	302	104	34.4	+ 61.4

*Fluoridation initiated in Newark, Del., in October 1950.
†Age at last birthday used at time of examination.

With regard to deciduous teeth in both the 1950 and 1955 groups, only those which were carious or filled were considered. Consistent with the pattern set for the permanent teeth, Table 3 shows a lower rate for all age groups examined in 1955 as compared with those examined in 1950, the DF rate for all children in 1955 being 1.92 as compared with 2.72 in 1950. Again the most noticeable contrast was in the six year olds with the 45 examined in 1955 having 1.47 carious or filled deciduous teeth per child as compared to 3.04 carious or filled deciduous teeth per child for the 73 examined in 1950.

Finally, two more interesting observations were made in the analysis of this study. One was the reduction in the rate of untreated carious permanent teeth. In 1955, the average was .768 untreated carious teeth per child, as compared with 1.72 in 1950. Although it was recognized that the number of children with caries-free permanent teeth would substantially alter the 1955

Table 3 • Comparison of DF* rates in continuous residence children in Newark, Delaware before fluoridation and five years after fluoridation

	1950—Before fluoridation			1955—Five years after fluoridation*		
Age†	Number of children examined	No. of carious deciduous teeth	Number of DF‡ deciduous teeth per child	Number of children examined	No. of carious deciduous teeth	Number of DF‡ deciduous teeth per child
6	73	222	3.04	45	66	1.47
7	88	301	3.42	69	205	2.97
8	70	169	2.41	73	152	2.08
9	63	167	2.65	53	96	1.81
10	53	87	1.64	62	61	.984
Total	347	946	2.72	302	580	1.92

*Fluoridation initiated in Newark, Del., in October 1950.
†Age at last birthday used at time of examination.
‡DF includes decayed and filled deciduous teeth.

figure, there is still a margin of difference between the two figures open to conjecture.

The second observation concerned the percentage of children who had received dental care, and this could well be the second major factor influencing the reduced rate in untreated carious permanent teeth in 1955. In this study it was found that 36.4 per cent of the children had received dental care in 1955, as compared with 23.1 per cent in 1950—there was an over-all increase of 57.5 per cent.

There is a certain significance attached to these two observations which seems worthy of note: that the parents who shared the effort to obtain fluoridation for their community know its limitations, and they realize that beyond that point they must assume responsibility for the dental welfare of their children.

The University of Southern California Century Club

Robert W. McNulty, D.D.S., M.A., Los Angeles*

Five years ago the Southern California Dental School possessed a new clinic building and needed only equipment to operate. Alumni under the leadership of Fred Olds, class of 1924, organized a plan for and personally solicited friends and other alumni for the funds necessary to equip the building.

Two years later, with over $300,000 raised, Southern California Dental School had one of the finest clinical centers in the nation with the newest and best equipment.

The solicitation brought together a group of professional alumni and friends who recognized the need for a continuing program of financial support for private education in dentistry. As a result the Century Club was launched in the interest of the Southern California Dental School.

Dr. Olds, who conceived the idea, was elected president; Frank Abbott, president-elect; Paul Davidson, vice-president and Alexander Kalionzes, secretary-treasurer. Cecil Dickinson, Dale Over, Jack Rounds, Dallas McCauley and Joseph Maley became directors.

Century Club membership is by nomination and election, and is restricted to alumni and nonalumni who meet requirements established in its bylaws. A formal application must be made, and a requisite to membership is a lifetime pledge of at least a $100 annual gift to the Club. Checks are made payable to the University and are spent for those programs relative to the advancement of the Southern California Dental School as well as the profession in Southern California.

After two years of preliminary work, the Club program was launched and a charter dinner held December 8, 1955, at the Los Angeles California Club. One hundred and sixty members attended the black-tie stag affair hosted by Southern California's President Fred D. Fagg, Jr., and the University Board of Trustees. A high light was the surprise announcement

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Ground breaking ceremonies for addition to Southern California Dental clinic. (l. to r.) Robert McNulty, dean, School of Dentistry; Fred Olds, president of Century Club; Mr. Tom Nickell, executive director, Southern California Alumni Fund and Earl Bolton, vice-president in charge of development at the University of Southern California

of an auditorium and research wing to be added to the clinic.

The second meeting was held during April 1956, and after discussions of new high speed drilling technics and the application of atomic materials in dental research, ground breaking ceremonies were held on the new building site (see illustration).

The Century Club then had a membership of 235 and expected to add another 100 prior to the second annual dinner in December. Of this number more than 30 per cent are nonalumni. Of the current officers the vice-president and one director are nonalumni.

The Century Club's success is based on the desire to help private enterprise and professional education, and the planning of an excellent annual program for the group meetings. The committee in charge secures outstanding people not necessarily of the dental profession for programs.

It is in keeping with the best tradition of the country and of the dental profession that individuals join hands in the support and preservation of free educational institutions. The Century Club of the University of Southern California Dental School appears well on its way and, as a new application of an old idea, is a type of organization that other dental schools could well emulate.

A Common Weakness in Writing • At bottom he [Fowler] seems to have thought that the real sources of bad writing were ignorance and pretentiousness. His most characteristic passages are those inveighing against genteelisms, polysyllabic humor, foreign words, elegant variations—all the devices by which a writer attempts to appear better bred or better educated or more intelligent than he really is. There is an underlying assumption that if all of us would only learn that the right name for a spade is spade and then call it that, most of our troubles with language would be over. *The New Books, Paul Pickrel. Harper's Magazine 214:88 April 1957.*

Annual support for dental education

Leon J. Gauchat, D.D.S.; Edward F. Mimmack,† D.D.S., Buffalo, N. Y., and T. W. Van Arsdale, Jr.,‡ Ph.D., Worcester, Mass.*

There is little question that dental education continues to be one of the most expensive postgraduate professional educational activities—not only for the students but also for the colleges and universities who sponsor it.

In general, independent colleges and universities must pay at least half the cost of the education, an amount which proves to be a considerable drain on the schools' income and hence restricts other educational activities.

Annual deficits are inevitable and must be met from sources other than the tuition and fees in the dental school. The University of Buffalo, an independent urban university comprising 14 divisions, has worked out what may be a unique approach to this problem. This approach is based on a belief in the responsibility of the University's dental school and the dental community to each other. By "dental community" is meant the alumni of the dental school, wherever they may reside, and graduates of other dental schools who are practicing in the Western New York region.

The method has been the University of Buffalo's Annual Dental Education Participating Fund.

In 1953, the University, as a result of a general development campaign, had just finished erecting its new medical-dental building at a cost of $4,500,000. However, the University and the dental community realized that, although excellent facilities for teaching and research were now available, increased funds were needed for expansion of the continuing education program for graduate dentists, expansion of faculty with the addition of more full-time teachers, expansion of research, increase in the number of students admitted and the avoidance of excessive tuition.

Dental alumni of the University had been contributing some $7,000 or $8,000 a year to the Alumni Loyalty Fund, but this amount was far short of the need.

Therefore, a group of 12 leading local dentists met with the dean of the School of Dentistry to assess specific needs and to arrive at the best means for meeting them. Their deliberations covered more than 22 evening meetings during the first year of their organization.

As a result of their deliberations, the Annual Dental Education Participating Fund was established. Dentists in the local dental community, whether or not they were alumni of the school, were asked to participate. A pledge of one or

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‡Former director of development, University of Buffalo; at present, vice-president, Worcester Polytechnic Institute, Worcester, Mass.

more basic, annual, continuing units of $100 was asked of each dentist.

About 100 dentists were enlisted by the original group of 12 to establish personal contact with the nearly 600 members of the profession in the Buffalo region.

A pledge of $100 annually means that the pledger becomes a member of the Annual Dental Education Participating Fund and is entitled to a membership card and a vote at the semiannual meetings. At these meetings, accountings of the use of the funds are detailed, and the plans and projects of the organization are determined by the membership. The participation of nongraduates of the University of Buffalo School of Dentistry was and is outstanding; nongraduates have served both as workers and as contributors.

By the end of the 1956 college year, the fund had been in progress for nine months and, during that time, nearly 500 dentists from Buffalo and surrounding communities had made a total annual, continuing contribution of nearly $45,000. The high percentage of participation of dentists in the region would seem to indicate ready acceptance of the concept of the responsibility of the dentist for dental education. A systematic approach to dental alumni who are not local residents is now being undertaken. It is expected that the total pledged and paid annually will then approach nearly $75,000.

There are benefits other than those of a financial nature. The number of students admitted annually will be increased soon. Dentists in the region have already come to feel a real responsibility for and relationship with the School of Dentistry. Newspaper publicity has been generous and intelligent and seems to have resulted in improved relations for the profession with the lay public.

If, as is generally understood, one of the fundamental steps in securing adequate financial support for a professional school is the demonstrated support of the graduates and their colleagues, it would seem that the University of Buffalo approach is a sound step toward getting additional funds from other sources as well.

Science and Education • I have been an investigator and a teacher of science, that is, I have tried to teach for fifty years. I think that we teachers underestimate the mental capacity of our average youths and fellow citizens. They can learn, they can understand, they can even reason, if we the teachers can really teach by word, by demonstration, by example. But we must rekindle the suppressed natural curiosity in our student, a curiosity largely suppressed by education through dictation, in the home, in the church, in the public schools and sometimes even in our colleges and universities. Education by dictation depends on memory, faith and tradition rather than on understanding of man and nature. The student, the teacher in every field of education should ask for the evidence, should examine the evidence. We cannot defeat ideas with guns or bombs or mere say so. Bad ideas can be defeated with better ideas based on better evidence. That is, we should apply the scientific method to our education at all levels; the scientific integrity, the scientific courage to face all the proven facts, but keep our mouths shut and our pen dry till we know the facts.—*Anton J. Carlson, Does the Greater Understanding of Man and Nature Increase the Scientist's Social Responsibilities? 1952.*

Evaluation of hypnosis in dental therapeutics from the dentist's viewpoint

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Hypnosis is utilized by respectable professional men despite the adverse opinions of those who refuse to investigate it or use it. Until today, one of the great controversies in medical history has been the debate on the value of hypnosis as an orthodox medical procedure.

Although hypnosis, since Mesmer's day, has continued to enjoy wide acclaim on the one hand and to suffer condemnation on the other, it has failed until recently to gain the official approval of organized medicine. This delay was due to ignorance of the scientific nature of hypnosis and the stigma placed on it by those who would abuse it. It was only after a wide-scale formal evaluation conducted by organized medicine that the British Medical Association in April 1955 announced[1] its recognition and acceptance of hypnotherapy as an established form of medical treatment. The report further urged that Britain's medical students be oriented in its medical, psychological and dental use.

In the dental profession a series of controlled experimental and clinical investigations of hypnosis has been in progress since 1948. These investigations are being conducted by ethical, trained practitioners in every section of the United States and Canada. Several thousand documentary case records on file with the American Society of Psychosomatic Dentistry attest to the successful use of hypnosis in practically every phase of dental treatment.[2]

Many of the dentists employing hypnosis belong to some local study group or national society established for and dedicated to further research in the science and clinical application of hypnosis.

The early user of hypnosis had to acquire his skills from whatever sources were accessible and according to his understanding of his needs. Fortunate was he who received what today is regarded as a well-balanced, adequate course of training, or tutoring from a qualified teacher. Just as possession of a dental degree does not qualify the dentist to practice hypnosis in dentistry, neither does knowledge or skill in trance induction alone assure the successful attainment of the therapeutic goal. It has remained for the psychologist to provide the missing link in this study, to orient the dentist in the better understanding and motivation of human behavior and to the

Presented as part of a symposium, "Evaluation of Hypnosis in Dental Practice," before the Section on Anesthesiology, ninety-seventh annual session, American Dental Association, Atlantic City, N. J., October 3, 1956.

1. Van Pelt, S. J. Milestone in medicine. Brit.J.M. Hypnotists 6:1 Summer 1955.

2. Kuhner, A. Dental hypnosis and the American Society of Psychosomatic Dentistry. Brit.J.M. Hypnotists 6:44 Summer 1955.

effective use of controlled suggestion.[3] Is it any wonder that hypnosis has defied definition and that controversy existed even among its users?

TRAINING IN USE OF HYPNOSIS

Today the dental profession has veritable sources of information on all phases of dental hypnosis. There is little room for controversy among practitioners who have received proper training by qualified teachers. The dentist interested in the truth about hypnosis should not be influenced by opinions and hand-me-down tales, but should investigate and see for himself what hypnosis can do.

In 1948 T. O. Burgess (father of dental hypnosis), a professor in psychology and a clinical psychologist, began to teach the principles and technics of hypnosis to dentists in the Midwest.[4] Under his guidance these dentists formed the American Society of Psychosomatic Dentistry. In that same year they began to promulgate the benefits that could be achieved by the proper use of hypnosis.[5] It is interesting to note that a similar organization appeared almost simultaneously in the East, the American Hypnodontic Society. Both organizations, though unaware of each other's existence, pursued similar policies to regulate and control the practice of hypnosis and insure that it is based on professional ethics, and to foster and advance study and research in the subject.[6]

The pioneers and their followers in the clinical use of dental hypnosis (men like Burgess, Weinstein, Moss, Ament, Wookey,[7] Shaw, Hyde and others) advocated that its users adhere to certain rigid principles of conduct. These principles have stood the test of time and have been substantiated experimentally and so conclusively as to become precepts not to be ignored. Two of these principles which lend insight into the proper dental application of hypnosis deserve mention:

1. Those who use hypnosis should be ethical, capable men trained in its use by qualified teachers.

2. Its use by dentists should be restricted to ethical dental purposes. The dentist should not enter the territory allotted to the psychologist and psychiatrist. He should not attempt to rid the patient of his bad habits or to solve his emotional problems under the influence of hypnosis. Neither should he subject his patients to stage and entertainment maneuvers. The success of hypnotism in dentistry is dependent on the strict compliance to the rule that hypnosis remain in the confines of dental work.[8]

The use of hypnosis as an adjunct to the practice of dentistry is no longer a controversial issue anywhere in the United States among the hundreds of dentists applying it who have been properly trained by competent teachers. The air of mysticism surrounding hypnosis has been cleared so that hypnosis can be recognized for what it is—a scientifically induced state of mind receptive to suggestion, a valuable aid in trained hands for the attainment of therapeutic goals. The number of patients seeking the benefits of hypnosis is steadily increasing.

Dentists on an ever-increasing scale are becoming interested in learning about the subject, as is shown by the greater number of lectures and clinics on phases of dental hypnosis appearing on dental society programs and by the articles on the subject in dental literature. More dentists are taking courses of instruction

3. Heron, W. T. Hypnosis and psychology. J.Am. Soc. Psychosomatic Den. 1:5 Oct. 1954.

4. Kuehner, G. F. Role and scope of psychosomatic dentistry. North-West Den. 30:245 Oct. 1951.

5. Burgess, T. O. Hypnosis in dentistry. In Experimental hypnosis, LeCron, L. M. New York, Macmillan Co., 1952, p. 322.

6. Moss, Aaron. Hypnodontics—hypnosis in dentistry. New York, Dental Items of Interest, 1952, p. 230.

7. Wookey, E. E. Uses and limitations of hypnosis in dental treatment. Brit.D.J. 65:562 Oct. 15, 1938.

8. Weinstein, J. Hypnosis in dentistry. Brit.J.M. Hypnotists 2:33 Spring 1951.

in direct proportion to the availability of such courses. The number of organized study clubs has at least quadrupled since 1948, which indicates an acceptance of hypnosis on a wider scale than ever before.

The recognized study clubs are composed of American Dental Association members who are regulated in their use of hypnosis by a constitution and bylaws. Membership is limited to professional men who comply with stipulated professional and educational standards.[9] One of these groups has been affiliated directly with its district dental society since 1951 and functions as the Hypnosis Study Club in the permanent study club section of the Cleveland Dental Society.[10] Its membership has been limited to dentists who present qualifications prescribed by the American Society of Psychosomatic Dentistry.

SOURCES OF INFORMATION

Today the dentist interested in learning about hypnosis is confronted with a conglomeration of both sound and scientifically controlled expositions on hypnosis, along with spectacular and invalid discourses by authors known and unknown in the field about which they write. Unless the dentist is guided by a reputable source of information he may find he has invested his time unwisely.[11,12] A letter to the editor of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION in April 1956 deserves mention here as a sensible solution to this dilemma.[13,14] It suggested that the dentist, before registering for a course in dental hypnosis, check with his district dental society for its approval of both the course and the instructor.

The *Journal of the American Society of Psychosomatic Dentistry* made its appearance in July 1954 and is answering a longfelt need for a source of authentic information on dental hypnosis. It is fulfilling its purpose to screen hypnosis for dentistry and to censor material for its value to the profession and to protect readers against the incursions of commercial hypnosis into the dental realm. It presents authentic material on the subject in order to help clarify and refine hypnosis for dentistry. Its wide reception indicates it is accomplishing its purpose.[15]

Another recent commendable movement was that initiated by H. B. Bartfield, president of the Chicago Society of Dental Psychosomatics, to unite the separate hypnosis study groups in the United States and Canada. Progress to date has resulted in the formation of the Academy of Applied Psychology in Dentistry. The American Society of Psychosomatic Dentistry, which already is a national organization, and the Michigan Society of Psychosomatic Dentistry, although not affiliates of this new body, have contributed their efforts to the movement and are in accord with it on all vital issues. Immediate action has been taken to elevate the standards of each member group to comply with the new constitution and by-laws. The academy fixed requirements for (1) a proper course, (2) a qualified practitioner and (3) an accredited teacher in dental hypnosis. This was in line with the group's purpose to restrict the practice of hypnosis in dentistry to those qualified to practice it and to discourage its use by those who would abuse it.

The main purpose of this paper is to cite the present uses of, and indications for, hypnosis in dental therapeutics so

9. Kuhner, A., editor. Constitution and by-laws of A.S.P.D. J.Am.Soc. Psychosomatic Den. 1:19 July 1954.

10. Kuhner, A. Hypnosis section of permanent study club of Cleveland Dental Society. J.Am.Soc. Psychosomatic Den. 1:10 Nov. 1954.

11. Ament, P. Philosophy of practice and teaching. J.Am.Soc. Psychosomatic Den. 2:6 Oct. 1955.

12. Wald, A., and Kline, M. V. University training program in dental hypnosis. J.Clin.Exper. Hypnosis 3:183 Oct. 1955.

13. Burgess, B. E. Seminars in hypnosis. J.A.D.A. 52:463 April 1956.

14. Editorial. Unapproved seminars in hypnosis draw fire. J.A.D.A. 52:492 April 1956.

15. Kuhner, A. Report of A.S.P.D. journal progress. J.Am.Soc. Psychosomatic Den. 2:4 Oct. 1955.

that the dental practitioner may decide whether it has practical use or value for him.

THREE CATEGORIES OF HYPNOSIS

Hypnosis can be divided into three main categories which embrace all of its dental uses:

1. The tranquilizing or relaxing phase —wherein relaxation is achieved and tension and nervousness reduced. The goal is to perform dental work without discomfort. Doctors often tell a patient to "relax" but they don't tell him how. Hypnotism can teach the patient to relax utterly and completely in body and mind. In this relaxed condition the patient is not unconscious but is capable of complete cooperation with the dentist.

2. The anesthetic or analgesic phase— where raising of the pain threshold is accomplished so that sensitivity to painful stimuli is reduced or eliminated. Although complete hypnoanesthesia is limited to those capable of achieving it, a common misconception exists that this is the main use for hypnosis in dentistry and that it is easily induced in most people. The up-to-date student is better informed. He has found a wider use for hypnosis in conjunction with chemical anesthetics to remove psychogenic pain or emotional tensions.

3. The building of confidence phase— here desensitization to dental procedures can be accomplished. Directive therapies and patient education can be employed relative to immediate dental problems. The patient can be taught how to relax himself at will and to remove tension during dental treatment, or he can be conditioned to relax easily for subsequent dental sessions. Most of these patients soon reflect a new self-confidence because of the positive means of help they now possess. Here again the dentist should be cautioned against overstepping the bounds of dentistry. Any psychological help must relate directly to the immediate dental problem and not extend into the field of psychotherapy. Nor should the dentist utilize regression or the psychoanalytic technics of the psychotherapist. The major use of hypnosis in dentistry is as an adjunct to other dental therapies. The one indication for its sole use is for hypnotically induced anesthesia in those few select instances where it becomes an invaluable substitute when chemical anesthetics are contraindicated and the patient proves to be a good subject.

DENTAL USES OF HYPNOSIS

Specific dental applications will, of course, depend on the need. Hypnosis can be used for the following dental purposes:

1. To control the overt behavior of the emotionally upset patient and to gain his confidence and cooperation so that the dentist can perform more efficiently the dental service needed without shock to the patient.

2. To perform dental service in a manner satisfactory to the patient's psychic needs and satisfactory to the dentist's requirements. Hypnotically induced relaxation has all of the advantages of physiologic relaxation therapy plus the fact that it can be accomplished more quickly and more effectively in more than 90 per cent of patients with or without the use of drug therapy.

3. To relax specific parts of the face and mouth to permit greater ease of operation for the dentist and less strain on the patient.

4. To control the gagging reflex where it interferes with dental procedures such as roentgenography, taking impressions, wearing dental appliances, and the nausea of fear.[16]

5. To control phobic reactions toward dental procedures to permit drilling, instrumentation and injections without ob-

16. LeCron, L. M. Relief of gagging by hypnosis J.Am.Soc. Psychosomatic Den. 2:13 July 1955.

jection, interference or syncope. Directive suggestions and the application of thought substitution can reduce psychic objections toward dentistry effectively and adjust the patient to withstand the disturbing effects of operative procedures.

6. As a substitute for or in conjunction with drug therapy. Every doctor is aware of the placebo, the pill which contains no therapeutic benefit except for the doctor's suggestions accompanying it to humor the patient. The deliberate use of controlled suggestion can reduce the amount of drugs necessary to achieve a delineated therapeutic goal, or it can potentiate the therapeutic effectiveness of the drug. The patient's physical well-being will be benefited when drug use is minimized as will his morale when he is dismissed in an ambulatory state having enjoyed a pleasant, relaxing experience.

7. In conjunction with chemical anesthesia to provide relaxation from fear and to reduce the amount of anesthetic usually required.

8. For salivation and hemorrhage control. The relaxation provided is an aid to blood clotting after surgical procedures. Control of the autonomic nervous system accomplished through hypnosis can reduce salivation in many instances.

FOUR CASE HISTORIES

The following case histories illustrate hypnosis as applied in some of the above phases.

A 15 year old boy was referred by his dentist to the author. His dentist reported that on three successive visits he had failed to get further than to lift a mouth mirror up to the boy's mouth. Each time the patient had vomited and now he (the dentist) had come to the end of his patience. Only because the boy's parents were patients of his did he make this last gesture to see if hypnosis might help.

The first session was spent in the business office. The boy had a full view of the operatory. As he looked at the dental chair he became pale and began to retch. His color and demeanor were promptly restored when he was assured no dental work would be done that day. The interview consisted of general questions relative to the boy's attitudes toward dentistry. He indicated he wanted to have his teeth fixed, only he was afraid and felt sick to his stomach whenever he even thought of it. He was asked if he always felt sick when afraid, and he replied that he did.

The boy was assured he would be helped so long as he really wanted to have dental care. It was explained that his vomiting and nausea were the natural result of his fear and tension, that similar reactions had been seen in other frightened patients, and that every one of these people had "gotten over the hump." He was told he would be taught a simple method of learning to recognize tension and fear in himself and then taught to relax tension away and that this would automatically remove his fear as well. The method of "dental hypnosis" for relaxation was discussed. He was asked what he thought hypnosis was and how he felt about it. He had heard of its medical use in childbirth and on the stage and his dentist had described its uses in dentistry. He was told what hypnosis was, what to expect, what the dentist would do and what was expected of him.

At the second session, the boy was able to smile a little as he entered the office. He was again assured there would be no dental work on this day, that he would only sit in the dental chair to learn how to relax. When he was seated some retching began which soon subsided as his attention was gained.

A suggestibility test followed by a first induction technic designed for relaxation was employed. The patient readily entered the trance state to the somnambulistic level. He was conditioned by posthypnotic suggestion to enter the trance

on a signal for future use. Complete physical relaxation was obtained. The patient said that he was pleased with the experience, that he had enjoyed a pleasant scene of watching a baseball game and that he felt he understood the dynamics involved.

Direct suggestions were made in the trance to the effect that he would gradually lose his fear of dentistry, but that so long as he was fearful he had in his possession an effective method with which to counteract these feelings and tensions. It was suggested he would not need to vomit so long as he would apply what he had learned. The session lasted one hour.

At the third session the patient entered the trance in a few seconds by signal. In the relaxed state, but with eyes open, oral examination and full mouth roentgenograms were completed uneventfully.

At the fourth session the patient again entered a trance in a few seconds on signal. In the relaxed state the left second permanent molars, upper and lower, were restored with amalgam under local anesthesia. Previous to the performance of the operative work, the patient had expressed some annoyance at the idea of the needle. He began to tense up and retching was again evident.

He was made aware of how fear was again at work. He was helped to relax once more. This time before operative work was begun it was explained to him what was to be done, what it would feel like and what he was to do. Positive suggestion was given to the effect that "putting in the procaine" would feel something like a mosquito bite and that it would not disturb his relaxed state in the least. The injection followed uneventfully.

Before operative work was begun he was again told what was to be done, what it would feel like and what he was to do while dental work was being done. He was told that the dental work would not disturb his relaxed state. The patient sat completely relaxed, attentive and cooperative to the dentist's directions on the one hand, while enjoying a pleasant, restful scene on the other.

On subsequent sessions, three or four cavities were prepared at each visit. On the fifth session the boy took his place in the chair. He looked up and said, "Doctor, do I have to close my eyes today?" He was told, "You don't ever have to close your eyes unless you feel you want to, so suit yourself. You know how to relax if you need to." All subsequent sessions were spent without further trance induction. This case refutes the oft stated objection that hypnosis takes too much time. The author has handled several such referrals and feels that the average dentist can master these situations once he understands the psychodynamics involved.

Whereas the case of this boy was an example of extreme anxiety, many patients can be made more comfortable once the dentist understands that disturbing emotional factors are not always overtly discernible. Some people maintain an outward calm but suffer inwardly. By permitting patients to show their feelings, whether by direct or indirect questioning, the observing dentist can help them to a better reward for their good behavior than just letting them grin and bear dental treatment.

A woman, aged 45, had just received a mandibular injection of procaine hydrochloride to which she had shown no outward objection. She was asked, "There, that was easy, wasn't it?" She answered that she really never was hurt as far as she could recall, but that she still always felt jittery and nervous in the dental chair. "I would rather have a baby than have my teeth worked on," she exclaimed. The author sympathized with her but indicated that this was not a matter of choice. It was suggested that all one needed to do was to relax when she felt that way. "I know," she said, "That's easier said than done. My physician has

told me the same thing, but how does one really relax?"

The author proceeded to demonstrate muscular tension of his arms and how to relax the tension. Then the patient was asked to imitate what she had seen. In just a few minutes she had relaxed herself completely. She remained in this state with her eyes closed until the operative work had been completed. Before she got out of the chair, the patient said that this was the first time she had enjoyed being in the dental chair and expressed thanks for the help. The principles of suggestion are at work at all times. They can be a valuable aid to the dentist who will study their useful applications with or without the trance state.[17]

The case of this woman also exemplifies how chemical anesthesia, although removing pain from the zone of the operation, often fails to relieve psychic disturbances. The holistic approach in dental treatment considers the total patient. This approach will assure greater comfort and consequent positive attitudes toward the dentist.

The case of a woman, age 56, illustrates the adjunctive use of hypnosis to local anesthesia to raise the pain tolerance threshold and reduce the amount of chemical anesthetic usually required. After four subperiosteal injections of procaine hydrochloride in the upper right cuspid, the patient still insisted she felt pain when the drill was applied. As the time allotted for the appointment was up, only a small part of cavity preparation had been possible. At the next sitting, the benefits of relaxation were introduced to the patient as a solution for her extreme sensitivity. In less than five minutes, complete hypnorelaxation was achieved, 1 cc. of procaine hydrochloride was injected and all the operative work was completed while the patient remained with eyes closed and cooperative. On being awakened she remarked how numb her tooth felt and how she had experienced no sensitivity.

The author's policy has been always to make use of chemical anesthesia, barring conditions which preclude its use, even though the subject shows capabilities for hypnoanesthesia. This eliminates the risk that the patient might come out of the trance and suffer pain. Sometimes a patient will ask for hypnoanesthesia for some particular reason. Again if the reason is only a dislike for needles, it is preferable to correct his attitude toward needles. The author does not try to replace any of the accepted methods of dentistry with hypnosis. The usual methods always are tried first without hypnosis. Should they fail, hypnosis is added.

The next and final case history represents a common type of patient who can be helped when he cannot help himself. A man, aged 52, a news reporter, was forced to leave an important assignment for an emergency extraction. As he sat in the dental chair he became noticeably upset and jittery. He was permitted to express his feelings. He confessed to a dread for what was to come and a pronounced concern for his own welfare. He related that he was convalescing from a recent heart ailment, that he should be on his job, and that he hated needles and to have teeth pulled. He was assured calmly that if he would follow some helpful directions he would experience no discomfort or untoward effects. On direction he quickly reached a deeply relaxed state and complied with the suggestion to keep his attention fixed on a fishing scene. A local anesthetic was infiltrated and the tooth removed. The patient was asked to remain relaxed and to enjoy his fishing for another five minutes during which time the bleeding was easily controlled. The patient left the office refreshed, having enjoyed a pleasant, relaxing experience and expressed gratitude for this considerate treatment.

17. Shaw, S. I. Behavior control of suggestion. J.Am. Soc. Psychosomatic Den. 3:10 Jan. 1956.

When asked how the fishing was, he replied enthusiastically that he had caught 30 bluegills and 2 bass.

For further interesting case reports and for a more detailed coverage of hypnosis in dentistry the reader is referred to the textbook written by Moss[6] and to the *Journal of the American Society of Psychosomatic Dentistry.*

SUMMARY

1. The dentist has in hypnosis a positive approach to allay anxiety and fear felt by the dental patient where the usual methods have failed.

2. The use of hypnosis is a recognition by the dentist of the need for a doctor-patient relationship which guarantees comfort and security to the patient where dentistry might otherwise become a situation producing pain or tension.

3. The dentist is amply rewarded for his effort in the patient cooperation which follows and the greater ease of rendering dental treatment.

4. Hypnosis has helped many who heretofore have not been able to tolerate dental treatment and hypnosis has been clinically proved by its trained users.

5. Hypnosis can help many more patients if more dentists are willing to study its applications and develop the necessary skill.

6. Hypnosis can become more available to both the public and profession when misconceptions, prejudices and fears surrounding it are removed and its benefits to the needy patient are appreciated.

7. The study groups have established a guide for the dentists as to the requirements of a proper course, a qualified practitioner and an accredited teacher in dental hypnosis.

8. Until hypnosis is established officially as an accepted dental procedure by the American Dental Association it will not be able to serve the many more whom it could benefit.

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Synthetic Penicillin • The chemical synthesis of penicillin, which for years has been one of the most baffling problems in chemistry, has been accomplished at Massachusetts Institute of Technology by John C. Sheehan, professor of chemistry, and K. R. Henery-Logan, research associate. Ten new kinds of the synthetic penicillin are now being tested for possible medical use. While the new chemical method probably will not be economical enough to compete with the established fermentation process by which penicillin is derived from molds, it is hoped that new forms will prove effective against disease organisms now resistant to natural penicillin and against a wider variety of infections. New penicillins might also have less tendency to produce allergic reactions. *News of Science, Science 125:591 March 29, 1957.*

Hypnosis in dental medicine: educational and clinical considerations

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The basic conflicts in dentist-patient relationships, as well as the conflicts in the dentist himself, have led dentists to seek ways to alleviate some of the tension and anxiety in themselves and in their patients. It is strange that these problems are not considered within the educational structure of professional training, especially since they are such important factors in the dentist's level of function. In spite of the apparent need and expressed demand for training in this area, schools of dentistry have been reluctant to accept this responsibility. Until now, little attention has been given to the need for curriculum planning and course presentation in hypnosis. Training usually has been acquired through clinical observation and some apprenticeship. By far the greatest demand and perhaps the most interest in clinical hypnosis currently is found in the dental profession.

To many dentists, hypnosis holds the promise of being a useful agent. The recent growth of interest in the field has led to dissatisfaction with the limited training which has been available. For the most part this training has served to introduce the dentist to the phenomena of hypnosis and hypnotic behavior. In an attempt to fill the need for more adequate training and to provide a professional level of teaching hypnosis and related phenomena, a course was offered in January 1955 as a joint effort of the American Hypnodontic Society and the Institute for Research of Long Island University, and was attended by men who had been using hypnosis in dentistry for varying lengths of time. The course was given at weekly three hour sessions, for one 14 week semester. The group was already familiar with the clinical aspects of hypnosis both through practical experience and varying amounts of informal instruction and study. The expressed need in this group was not for instruction in clinical technic but rather for help in understanding the structure of the interpersonal relationship in which hypnosis has a role.

The formal lectures by the members of the staff and guest lecturers were oriented toward the dynamics of the hypnotic situation, and consideration of the needs of the patient's total personality. Indications, uses, abuses and contraindications of hypnosis were discussed, experiences were analyzed, and attitudes were evaluated. Extensive corollary reading was expected to parallel the lectures. Lectures were given on the broad aspects of hypnosis in many types of therapeutic

Presented as part of a symposium, "Evaluation of Hypnosis in Dental Practice," before the Section on Anesthesiology, ninety-seventh annual session, American Dental Association, Atlantic City, N. J., October 3, 1956.

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and experimental situations in an effort to afford a solid theoretical and clinical background for experiences in the dental field.

Throughout the course, every effort was made to orient the material to the requirements of the dentist in his professional role. Several dentists with clinical experience in hypnotic procedures served as members of the teaching staff. The use of hypnosis by the dentist was integrated with nonhypnotic methods of establishing a more comfortable dental situation. The use of hypnosis in the control of anxiety, gagging, salivation, tension and pain was stressed, and its limitations defined. Demonstrations of hypnoanalytic technic with an extremely anxious patient who was unable to accept dental treatment led the group to greater insight and understanding of the more common emotional problems encountered. Historical background, theoretical concepts, psychoanalytic dynamics and practical applications of hypnotic behavior were discussed.

Although the time was insufficient to permit complete exploration, the amount of stimulation in these directions was clearly evidenced by the change of character of the discussion periods as the course progressed.

Because this first group of dentists already had clinical experience and background, comparatively little time was spent on actual technics of induction and deepening of the hypnotic state, and more time on the underlying dynamics of the situation. This approach led to a basic conceptual change on the part of the students, and an awareness of the relationship potential, not only in the hypnotic process but in the unaltered conscious state. This awareness was instrumental in stimulating insight on the part of many students and was the basis for the formation of a therapy group at the conclusion of the course.

The inclusion of behavioral, psychoanalytic, psychometric and psychosomatic material gave the students a basis for the more adequate use of hypnosis. As a result of this educational experience and with additional conferences and curriculum-planning discussions, a three semester program in the psychological problems of modern dentistry has been outlined and developed at Long Island University. Its purpose is to train the dentist to utilize hypnosis as a clinical psychological procedure within a frame of reference which takes into account advances in psychodynamics, psychosomatic theory and concept, and the utilization of psychotherapeutic technic in medical psychology.

Instructors consist of dentists, psychologists and physicians experienced in hypnosis and working in the psychological and medical fields pertinent to dental practice.

The current students have had little or no previous experience with hypnosis, but have sought training because of their recognition of the need for methods to deal with the psychological problems within the dental situation. In this training the dentist is indoctrinated with a groundwork of psychological theory, relationship dynamics, and the emotional meaning of the hypnotic state.

The study of psychometrics, projective testing, psychosomatics and the evaluation of neurotic behavioral patterns affords a basis for later instruction in hypnotic induction and in the utilization of the hypnotic process. With five instructors the class is divided into small groups for supervision, clinical teaching and discussion. Rotation of the instructors affords the student broad opportunity for varied interpersonal situations.

It is projected that these small instruction groups will alter their character as the course progresses and become control situations for instances in which hypnosis is being used in the dentist's own practice. Group control of this character permits personal development as well as specific instruction. It is possible that

one or more of these groups will evolve into analytic therapy groups of a continuing nature.

OUTLINE OF PROGRAM

Experience thus far indicates that the need for the adequate training of dentists in hypnosis can best be filled by a three semester program divided into the following phases:

1. Introductory course

Historical aspects of scientific hypnosis
Hypnosis in contemporary scientific perspective
Introduction to psychodynamic and psychoanalytic psychology
Nature of suggestion and its relation to hypnosis
Phenomena of hypnotic behavior
Induction technics
Termination technics
The nature of resistance to hypnosis and its clinical management
Anxiety: its meaning and role in psychotherapeutic relationships
Outline of psychopathology and abnormal psychology
Principles of psychotherapy and their relationship to dental practice
Clinical practicum in hypnotic induction, management and termination
Demonstrations of hypnotic behavior
Hypnodontic procedures in operative dentistry: anesthesia, relaxation, treatment of anxiety and surgical applications
Psychosomatic aspects of dentistry
Clinical practicum in hypnodontic procedure
Review of contemporary research literature in clinical and experimental hypnosis
Clinical procedures in patient evaluations: the interview; life history taking; psychological tests and questionnaires, and the use of psychological and medical consultation

2. Advanced course

The psychopathology of emotions, learning, perception and motivation
Developmental and comparative psychology: personality concept; the nature of conflict behavior, and neuropsychological process
Emotional and somatic reactions to hypnosis: diagnostic evaluation; utilization in patient management, and the meaning of hypnosis as an interpersonal relationship
Complex hypnotic phenomena: induction of depth trance states; alteration of sensory, motor and perceptual functions; transcendence of voluntary capacity levels of response; posthypnotic behavior, and hypnosis and conditioning
Psychosomatic theory and concept in present-day medicine and psychology: review of the research literature; hypnosis as a psychosomatic phenomenon; the evaluation and classification of somatization reactions; stress and its relation to behavior; the organization of psychosomatic behavior, and psychosomatic problems and their management in dentistry
Hypnotherapy: indications; contraindications; procedures and technics, and application in clinical dentistry
Psychotherapeutic considerations: outline of psychoanalytic psychology; consciousness and unconsciousness; the structure of neurotic behavior; directive psychotherapy; nondirective psychotherapy, and hypnoanalytic procedures and their relationship to other aspects of patient management in dentistry
Experimental hypnosis: age alteration; the nature of amnesia; automatic writing; self-hypnosis; dissociative process; multiple personality; hypnotic dreams; hallucinations in hypnosis, and hypnodrama
Hypnosis as an investigative and research device: case seminar on psychological problems in modern dental practice, with case presentation, tape recordings of case material, and supervision and control of clinical cases by participating dentists

3. Individual control and supervision in the clinical use of hypnosis in dentistry

The program outlined is the product of experience in teaching dental hypnosis and of an awareness of the difficulties involved. Hypnosis cannot be taught or utilized as an independent device or operative procedure unless the operator has a well-developed background in psychodynamics and medical psychology. The integration of hypnosis within such a frame of reference requires a thorough and intensive teaching program. Such a program must include a clinical practicum and direct supervision of the dentist's use of hypnosis.

At the advanced level, group analysis of the dentist-patient relationship is designed to give the participating dentist greater knowledge of himself and his

feelings as they may influence his relationship with patients. Structured as a group therapy experience, the analysis can be utilized as a means for indicating those dentists who may require or wish additional psychotherapy in order to increase their professional competence.

As this training program continues, it will in all likelihood undergo considerable modification and change. Already plans are being formulated to use psychological tests to select the best student group and detect those candidates who should not at the time be involved in this type of training.

It is hoped that this program may be of interest to others involved in similar or related programs and that from joint efforts and observations will emerge the type of education and training consistent with the highest degree of competence in the professional utilization of hypnosis.

NATURE OF HYPNOSIS

As dentistry has broadened its concern for the patient's oral condition to include a comprehensive concern for his total health, increasing importance is being placed on emotions and the role of psychological factors in the total treatment plan. In this frame of reference, clinical hypnosis and psychosomatic considerations have heralded a new phase in the growth of dental medicine.

As the dentist utilizes hypnotic technics in his clinical practice, it is necessary that he be well grounded in the basic psychological formulations which give rise to hypnotic phenomena and the interpersonal dynamics of treatment at hypnotic levels.

Hypnosis is a part of a process called "the organization of behavior," and all who aspire to its proficient application must have a thorough understanding of the dynamics of human behavior. Without this underlying knowledge there can be no judicious use of hypnosis either in medicine, psychology or dentistry. The purpose of this paper is to outline briefly the boundaries of the psychological structure within which hypnotic reaction and phenomena can be viewed.

The illusion of motion as seen in motion pictures is a realistic thing. Yet it is an illusion, based on the capacity of the viewer's brain to organize particular stimuli into a configuration which gives an impression of motion. In a parallel sense, consciousness is an illusion. It is real, but nevertheless a reflection of the meaning and attachments that one makes within the framework of his own sensory order, so that when one studies hypnosis and when one works with it, he is working with an important element for controlling and determining aspects of consciousness.[1]

As a person becomes more aware of this phenomenon, he can see more than the element of suggestion being involved. Reality is determined by a number of things, but certainly it is greatly determined by perceptual awareness, and this awareness in turn is converted into behavior and in turn converted into meaning by the relationship that a person makes to reality through his associations, experiences and by some of the involuntary reactions that take place.

Actually, hypnosis, being a manifestation of consciousness and of a fluctuating phase of consciousness, is the means by which an individual is able to interpret and extend the range of experience—of phenomenological experience, so that it can be said that hypnosis involves behavioral experience based on one's own associative reactions to control and to maintaining control or balance within himself.

Dr. Kluver, of the University of Chicago, in a statement concerning the nature of mind and man in relating to

1. Bowles, J. W., Jr. and Pronko, N. H. Reversibility of stimulus function under hypnosis. J. Psychol. 27:41 Jan. 1949.

reality, asserted[2] ". . . that it should be possible not only to change sensory qualities experimentally, but to create altogether new sensory qualities which have never been experienced before." In other words, the range of reality experience is not necessarily limited by the sensory phenomena that are consciously associated with a variety of behavioral reactions.

This is what is seen often in hypnosis. The emergence of new configurations of feeling, of meaning and of association, is seen, and this is what makes the interpretation of hypnotic behavior complex and at times not easily understandable.

When an individual enters into a profound hypnotic relationship with the hypnotist, he is really giving up a tremendous amount of control. That is, he is giving up a degree of control over what determines reality for him, because now reality is being filtered through the ego of the hypnotist. He is now permitting reality to assume any range of dimensionality that the hypnotist wishes him to. As such, the subject or the patient is attached to the hypnotist in an archaic or retrogressive state.

Actually the hypnotic relationship is one between a living organism and something which the living organism can use for interpretation and awareness of reality. As such, the nature of reality that is going to be experienced is going to be determined by what the hypnotist does and by what he does not do.

It becomes increasingly clear that the difficulties (and there are bound to be difficulties when anything as potent as hypnosis is used) are produced more by what the hypnotist does not do—that is, what he may fail to recognize in his own feelings and motives—than by what he does. It is his omissions that may create complications.

The dentist should be aware of what hypnosis means to a person who permits himself to enter into such a meaningful relationship with another person. This is not something that is done easily, and it is not something which is done without resistance. Resistance in hypnosis always exists, although it may not always be recognized. An awareness of resistance is the first step in understanding the kind of hypnotic relationship achieved and gives important clues and guides as to how this relationship which has been established can best be used.

Actually, responses due to hypnotic intervention are not necessarily limited to the words or to the direct suggestions that are employed by the hypnotist, but may be intermediate responses determined by the reaction of the individual subject to the meaning of the hypnotic communication.

In experimental attempts to alter temperature and the temperature regulating mechanisms in humans, for example, it is found that once a subject is placed in a deep hypnotic state and given direct suggestions that his temperature is going to go up or go down, meaningful or significant changes in temperature are not usually observed. In fact, often no significant changes occur. The subject may exhibit clinical signs of temperature alteration. He may appear uncomfortable; he may perspire; he may go through a number of behavioral equations which seem to suggest temperature elevation or temperature decline. But if his temperature is taken, there is often little change.

On the other hand, without any mention of temperature at all, an illusion may be created which also includes an hallucinatory experience. When an individual is told that he is going to feel himself rising in an airplane to a great elevation and specific reference is made to that elevation, whether it is 75,000 feet or 100,000 feet, spontaneously there is a drop in the subject's temperature, a drop as great as four or five degrees. This drop

2. Klüver, Heinrich. Introduction to Hayek, F. A. The sensory order. Chicago, University of Chicago Press, 1952.

will take place within 25 or 30 seconds. There is no suggestion for temperature alteration at all; this is a spontaneous incorporation of an experience and of a change of reality perception which is taking place as a result of intervening with the subject's own reactions to himself in relation to his environment. A meaningful illusion has been created and the subject is reacting to it.

It can be seen that the simple suggestions that are given are not simple; that the reactions are not based on the suggestions alone, but on the reactions and associations made to what the hypnotist is saying. This is particularly true with regard to the induction of hypnosis and some of the problems concerning induction.

Study of the patient's reactions to the induction of hypnosis has led to an increased understanding of the meaning of hypnosis itself. For example, it has become clear that many patients equate hypnosis with a sexual relationship. Other subjects equate it with a death relationship. Many patients equate it with a threatening or noxious situation.

There is one generalized reaction, and that is that hypnosis in itself constitutes a threat to the individual.[3] The way in which the subject handles this threat usually is in keeping with the way in which he handles anxiety. This handling may be on a subliminal or a conscious level, or it may be on a much more overt acting-out level. This demands recognition and understanding; it requires a careful observation of spontaneous reactions to hypnotic induction, and there are always spontaneous somatic reactions as well as spontaneous ideational reactions. Sometimes the initial response to induction must be investigated to provide further clues as to what is happening.

Considerable clinical research[4] has been done in this area. The first point is that resistance to hypnosis is a natural and fundamental characteristic of hypnosis. The nature and pattern of such resistance are highly variable and may be expressed through a conscious acting out of anxiety and its meaning, or through unconscious emotional incorporation.

When hypnosis is conceived of as a threat to the patient's equilibrium, he will attempt in some way to compensate for this threat and will try to re-establish equilibrium on a new basis. Whether he establishes this equilibrium through regressive infantile behavior, whether he incorporates into himself some of the personality characteristics of the hypnotist in order to maintain freedom from anxiety, or whether he will now permit to emerge certain latent characteristics of his own personality as a defense against the threat, is determined largely by the character structure and emotional needs of the subject. As such, hypnosis constitutes an exceedingly important diagnostic technic. It may be used as such not only in psychopathological areas, but also to study and anticipate many reactions which patients may develop in relation to the use of drugs, so that, as psychopharmacology becomes more important, it becomes possible to investigate the meaning of certain drugs and the effect of certain drug technics on an individual's ego and his behavioral reaction to this procedure.

Some induction problems that were encountered where it was possible to investigate the reason behind the patient's response are discussed below.

In the first instance, a 24 year old married woman was being seen for psychotherapy.[4] She had agreed to the use of hypnosis. It was one of the things that she was seeking at the time in terms of her treatment. The first hypnotic session

3. Kline, M. V. Hypnotic retrogression: a neuropsychological theory of age regression and progression. J. Clin. Exp. Hypnosis 1:21, 1953.

4. Kline, Milton V. Hypnodynamic psychology. New York, Julian Press, 1955.

had produced no apparent resistance—that is, no resistance which could be noted clinically. The second session, however, was characterized by intense resistance, although it occurred only a few days after the first session.

The patient was able to enter a light hypnotic state, but when suggestions were given for deepening it, she stiffened noticeably and began to bite her lips. She did not come out of the hypnosis, but appeared to be uncomfortable. Her hands were at her side until they were placed over her genitals and were held there rigidly. She doubled up and turned away from the position in which she had been lying on the couch and now faced away from the hypnotist, toward the wall.

When further suggestions were increased her eyes opened and she sat up. She clearly was out of her hypnosis. She said that the hypnotic experience had been an unpleasant one and that she didn't want to use it any more.

The next time the patient was seen, she was apologetic about her reactions to hypnosis, but again indicated that she did not want to continue to use it. She was seen for a number of months after that. About four months after the second hypnotic session, she said spontaneously, "You know, there was something about that second time we used hypnosis that I've been wanting to tell you for a long time, but I haven't been able to say it until now. When you told me that I was going deeper and deeper into a hypnotic sleep, I had a picture of myself and of a girl friend. . . ."

The patient had maintained a homosexual relationship with this girl, and went on to describe the fantasy which emerged of having an active homosexual experience with this friend. This had precipitated much anxiety on her part and had made her extremely uncomfortable. When asked what had stimulated this fantasy and this reaction, she said, "When you used the word 'deep' that was what did it. Immediately I thought of this girl." She then elaborated all the other associations.

This will indicate that in the hypnotist's choice of words and in his choice of approaches and technics in handling hypnosis, he may create many problems, even though his intent may be to eliminate emotional or somatic distress. Those who have used hypnosis and other psychotherapeutic technics have become aware of something which often may not be said aloud, and that is that it is much easier to make people sick than it is to make them better. This must be kept in mind, particularly with regard to hypnosis, because of the potency which it bears in terms of mental phenomena.

Often the hypnotist creates for his patients challenges which are dynamically related to their own problems—challenges of which the hypnotist is unaware. In facing them with challenges, however, the hypnotist is intensifying their resistance, and intensifying the defenses they create against their own problems. On the other hand, it is possible to elucidate the nature of these problems, to interpret and analyze the meaning of resistance and frequently the nature of a patient's defenses.

It is common for patients to experience the illusion of levitation in hypnotic inductions. Often the subject will not verbalize these experiences, but if asked afterwards, he will tell about them if he wishes to. If he does not tell the hypnotist at first, he may tell later on, depending on how comfortable he feels. For example, a patient during the induction phase—after her eyes were closed—experienced a feeling that she was rising in the air. She said that the chair was slowly rising straight up in the air.[4] She did not seem concerned over this sensation at first, and no attempt was made to correct the illusion; instead, steps were taken only to deepen the hypnosis. Suddenly the patient cried out: "I'm going to be crushed—I'm being pushed against the ceiling—stop me—stop me—help me."

Then the subject spontaneously came out of the hypnosis with evidence of intense anxiety; she was trembling and breathing heavily, her palms were moist and she complained of severe nausea.

In connection with this not uncommon reaction to the induction of hypnosis, Horton[5] described several instances in which sensations and perceptions of levitation were found in association with hypnotic procedure. One instance involved a psychologist who served as a hypnotic subject experimentally.

After the induction he experienced what he called a sort of "waking dream" —the dreamlike reaction which might be called a "seeing visualization" or a fantasy. He stated:

> I would be lying on the bed and I would see a very large, heavy piano that we had. It was floating in the air. This was when I was a kid—10 or 11. I would imagine that the piano was getting larger and larger and that it was soaring in the air above me, and I would be afraid. I would be afraid that it was going to fall, that it would fall on top of me and that it would kill me, that it would crush me to death.

Actually, the subject is afraid of being overwhelmed. He is afraid of being crushed by the hypnotic relationship. He is being frightened by the process of induction and by the threat which the hypnotist represents for him. When the spontaneous reactions to hypnosis, and particularly the somatic ones, are examined it is noted that almost all of these involve vasomotor changes in terms of the sensory as well as the peripheral physiology of the subjects.

In recent research, apart from the vasomotor changes associated with the induction and termination of hypnosis, it also has been noted that induction may be accompanied by changes in body temperature. Ravitz[6] reported an interesting study with regard to changes in direct current potentials at the point of induction of hypnosis and at the point of termination of hypnosis.

The appearance of any or all of these characteristics as well as additional signs of physiological response are important to note because most of these are signs of anxiety—often, of rather intense anxiety. In order to make hypnosis effective, the hypnotist must be aware of the meaning that this interpersonal relationship has both for the patient and the doctor. This will never be quite the same. It will vary and fluctuate considerably, not only from individual to individual but within the same person, so that again it becomes a matter of emphasizing the question about who is hypnotizing whom, the patient or the hypnotist.

Recently, in work with professional students who were learning hypnosis in the course at Long Island University, the author's observation of a number of students while they were working with subjects indicated that before the subjects entered a definitive hypnotic trance state, the hypnotists themselves had entered hypnosis. In one instance, the hypnotist had reached a somnambulistic state before he had achieved the hypnotic state with the subject. This may occur much more often than is realized.

The understanding of hypnotic response actually constitutes a search for the basis of the organization of behavior, not for an explanation of hypnotic phenomena. Hypnosis can be understood only by understanding the way in which behavior itself evolves.

Many of the so-called physiological reactions of hypnosis are not detached physiological reactions. They are phenomenological reactions in which the individual experiences more than physical and even sensory alterations. For instance, hypnotic anesthesia is not the same as chemical anesthesia.

When pain is suppressed hypnotically,

5. Horton, L. H. The illusion of levitation. II. Clinical aspects. J. Abn. Psychol. 13:119 June 1918.
6. Ravitz, L. J. Electrometric correlates of the hypnotic state. Science 112:341 Sept. 22, 1950.

an electromyographic recording indicates the existence of the pain and the intensity of the pain, but there is a disassociation of the pain in terms of reality appraisal. Certainly, hypnotic anesthesia operates on a vastly different psychological basis than does chemical anesthesia. In many respects hypnotic behavior, like other forms of psychologically organized responses, parallels the biological apparatus and the biological organism. The parallel is a close one, and this is true not only with regard to hypnosis but in other areas of behavior.

Hypnotic deafness is interesting to observe. When an individual achieves hypnotic deafness, he appears actually to be deaf. He doesn't respond to most sources of auditory stimulation. But is hypnotic deafness the same as organic deafness? If it is the same, then it simplifies what is happening with regard to hypnosis. If it is not the same, then it becomes vital that the process that has really taken place be evaluated.

In a recent study, hypnotic deafness was induced in a number of subjects. In one subject, hypnotic deafness appeared clinically to operate on the same basis as organic deafness. There was a clinical loss of general auditory reflexes, and even auditory stimulation which involved strong verbal and conscious threats to the individual failed to produce observable sensory or motor reaction. In every respect the subject appeared to be deaf.

The experimental procedure which was employed was that of auditory feedback. It has been observed that the spontaneous effects of feeding back an individual's speech into his own ear produces stammering. When a tape recorder and an amplifier are used and a pair of earphones plugged in to the amplifier, and when one speaks into the tape recorder and his own speech comes back into his ears relayed through the amplification apparatus, it can be relayed one quarter of a second after he has spoken. That is the amount of time it takes the speech to transverse the tape, go through the amplifier and come back into the speaker's ears.

When the speech does come back, something happens which is almost the same for all people; the subject starts to stammer and to slur his speech. The effect of feedback of speech is to immobilize the production of speech, and particularly to effect the organization of some thinking.

There is one exception to this, however. People who are deaf do not show this reaction. People who are deaf can have their speech fed back without any alteration in their own speech. As such, it has become a positive and easy technic for doing two things—for identifying people who feign deafness, and for the further diagnostic evaluation of hysterical deafness.

After the induction of hypnotic deafness in one subject, he was asked to read a number of passages which it was known he could read without any difficulty. When his speech was fed back to him in the waking state and in the hypnotic state in which there was no hypnotic deafness, he stammered and stuttered. When hypnotic deafness was induced, there was still some slight stammering, and a slight slurring, but there was no perseveration, and the over-all difference in speech was striking. There was actually an improvement in the organization and production of speech on a level which exceeded the nonhypnotic deafness production by about 85 per cent.

In other words, he showed only some 20 per cent loss of normal speech in terms of tempo, rate and accentuation. But most striking was that during the nonhypnotic feedback state, when the subject was struggling, there was an obvious change in pulse rate and a pronounced change in body posture, with tremendous agitation. In one instance where this was prolonged experimentally beyond ten minutes, a miniature psychotic reaction was precipitated. The effect of a con-

tinual feedback with the inability to defend oneself against this feedback was such as to produce acute emotional disorganization and to produce signs of stress and of psychopathological behavior.

On the other hand, it was found that when hypnotic deafness was induced, although this was not organic deafness, not only was the speech improved but the disturbed and agitated qualities which had been observed in the subject's behavior were completely lacking. Although speech was not perfect, the individual was relaxed and comfortable. There was no apparent alteration in his posture; he did not exhibit any pathological reactions; there was no agitation.

When this phase of the experiment was over, the subject left in a comfortable state and reported no postexperimental difficulties. When he and other subjects in nonhypnotic studies were exposed to feedback stimulation, however, they had many postexperimental reactions, including severe migraine and gastrointestinal attacks. They had all of the somatic and many of the emotional equivalents of what may be described as "neurotic components," and in some instances "psychotic components."

The importance of this for those using hypnosis lies only in the fact that hypnosis as a perceptual mechanism is capable of blocking and of masking many of the effects of feedback—and mental feedback is something that goes on all the time, through all states of consciousness and unconsciousness. It is a process which is related not only to the feedback of speech but of ideas, thoughts, associations and emotions.

It may be more important to be aware of what hypnosis does than to use it. The delimited and specific application of hypnotic technic often becomes more desirable in the total management of a clinical behavior situation than the more large-scale attempts to utilize hypnosis as a lever for changing or altering behavior.

It is hard to change behavior in a total sense, but it may be much easier to segregate and to select specific elements in personality structure or in the handling of specific components of anxiety on the part of an individual and concentrate on these elements. Often in the alteration of one element, the entire configurational reaction of the individual may be altered, and relatively profound changes in behavior of the individual may be brought about.

As mentioned earlier, whereas body temperature may not be lowered by suggesting to a person that his temperature is going down, he may show all the clinical signs of a lowered temperature even though his temperature readings remain relatively constant. But when a specific element of perception which is the illusion of height is dealt with, the illusion produces vast changes in temperature-regulating mechanisms.

Other illusions—for example, of descending to great depths in the ocean and coming up suddenly—produce not only the emotional equivalent of the "bends," but many of the physiological reactions which accompany decompression sickness.

Ultimately, all who use hypnosis must face a basic problem—the relationship of hypnosis to other dimensions of behavior reactions. For example, what is the relationship of hypnosis to conditioning? Recently, a series of provocative, important studies indicated that when one deals with conditioning and when one examines the effects of conditioning, one is actually examining the results of the consequences of a hypnotic experience and a hypnotic procedure.

Pavlov's basic process of serial conditioning and of the induction of a conditioned response is, by its repetitiousness and its monotony, similar to and suggestive of hypnotic procedure. On the other hand, a conditioned response which is acquired in a laboratory situation with a human subject and a posthypnotic re-

sponse which is acquired in a laboratory may show different characteristics.

A conditioned response of a nonhypnotic type shows a different pattern of extinction—it goes into more rapid extinction; whereas the "conditioned" response which appears to be produced as a result of a posthypnotic suggestion has much greater strength, greater tenacity and frequently will not die out at all.

Recently, in some work being done in investigating the reactions of amputees to prosthetic adjustment, the author became concerned with the problem of conditioning, and found that it was difficult to produce conditioned responses in humans, which is a general observation that many investigators have made. If those studies that do report conditioned responses in human subjects are examined, however, it is found that the organic systems that are used for conditioned responses usually include those which respond most easily to hypnotic suggestion. When classical serial conditioning was attempted with hypnotic subjects, conditioning was achieved rapidly, and in a number of instances could not be extinguished quickly even though this was attempted. In one subject a month was required to extinguish a conditioned response which had been produced hypnotically.

What happens when one attempts to induce a particular reaction in a human being? If the hypnotist is producing under certain circumstances conditioned responses and conditioning, he must be aware that this is happening, and be familiar with the consequences of conditioning, and what some of the by-products of conditioned behavior may be.

It is through the understanding of these by-products that one becomes more aware of the total pattern of response. Certainly, an essential element in the field of hypnosis that is needed today is more concentrated and intensive research on the basic aspects of hypnosis. It becomes the responsibility of those who are going to use hypnosis clinically also to be responsible for observing what they do, and attempting to report and (within the limits of their competence) to undertake those types of research studies which will lead to greater understanding about what is being done.

It is unfortunate that many professional workers who use hypnosis fail to appreciate what they are doing. This is why periods occur in which enthusiasm for hypnosis and for the utilization of hypnotic technics in medical treatment and in psychotherapy reach great heights and then decline.

As the users of hypnosis attempt more and more to relate what is being done to the basic aspects of behavior, they will emerge from a limited perspective of direct suggestion in hypnosis into the area of the dynamics of human behavior. Although Freud abandoned hypnosis, it was through hypnosis that he gained many of the insights which led to the emergence of psychoanalytic principles.

Freud said that for him hypnosis was extremely valuable because within it he saw the unraveling of the human mind.

Today it might be said that through hypnosis the organization of behavior can be seen since one is no longer concerned with the mind alone, but with the totality of human experience. To understand and use hypnosis in dental medicine and surgery is to comprehend and utilize the understanding of human behavior and the dynamics of the doctor-patient relationship.

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Hypnosis, mental hygiene and the dentist-hypnotist: a psychiatric discussion of the potentialities and dangers of hypnosis when utilized during dental practice

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Hypnosis has tremendous potentialities in dentistry. Misconceptions about the effects which it is hoped can be attained through its use,[1] however, seem part of the cultural superstition of today. These misconceptions have been intensified by the "Bridey Murphy" hysteria,[2] and by the charlatanism and quackery to which that story has given rise. Some dentist-hypnotists, along with many other people, unfortunately have become hypnosis-reincarnation conscious.

Hypnosis is a useful and helpful addition to the armamentarium of the dentist,[3] but if it is to be utilized certain unavoidable responsibilities must be assumed.[4] According to the 1955 report[5] of the Psychological Medicine Group Committee of the British Medical Association, hypnosis

> . . . may involve the rapid or immediate development of a relationship between hypnotist and subject of the same order and intensity as is produced more slowly in the course of psychotherapy. . . . The application of the hypnotic technique without such knowledge and experience provides no control of the powerful emotions which may be released.

Without knowledge of what can be characterized as the "motivational bases of human behavior," the individual who hypnotizes others may be unaware of the fact that emotions have been released. Nevertheless, the hypnotic relationship must always be considered a relationship between at least two individuals, an interpersonal relationship. Whoever makes use of hypnosis, therefore, should be cognizant both of his emotions (and emotional difficulties) and of those of his subject. The potentialities of hypnosis for use in dental practice are pronounced,[6] but unless the above warning is borne in

Presented as part of a symposium, "Evaluation of Hypnosis in Dental Practice," before the Section on Anesthesiology, ninety-seventh annual session, American Dental Association, Atlantic City, N. J., October 3, 1956.

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mind, the misuse of hypnosis will be frequent and its dangers will be grave.[2, 7-9]

HISTORICAL BACKGROUND

Hypnosis was an ancient art long before the memorable contest between Moses and the magician-priests of Pharoah's Egypt.[10] One scholar has stated[11] facetiously that Eve was delivered from Adam under hypnoanesthesia. Nevertheless, most preindustrial cultures so far studied lacked a meaningful knowledge of hypnotic induction technics.[12] Yet, even in ancient Greece, it was used by the Asclepiadae both as an analgesic and a sedative.[13] In more modern times its clinical applications as an anesthetic[14] were aborted by the discovery of chemical anesthesia; yet, long before the use of ether by Long in 1842 and of nitrous oxide by Wells two years later, hypnoanesthesia constituted almost the only effective controlled and controllable means of dealing medically with severe pain.[15] Its use in dentistry was obvious. By 1837 Oudet in France was extracting teeth under hypnosis.[16] Australian dental officers interned in Japanese prison camps during World War II found themselves without chemical anesthetics and as a result began doing dental surgery under hypnosis.[17] At least six separate dental societies have recently combined to form the Academy of Applied Psychology in Dentistry,[18] with the following objectives: To set training and ethical standards for the use of hypnosis among dentists; to promote and to popularize among their colleagues the use of hypnoanalgesia and hypnoanesthesia; to promote hypnotic technics to prevent gagging and nausea, to control excessive salivation, to accustom patients to orthodontic appliances, to alleviate the pain of orthodontic bands, to decrease or eliminate the fears and the anxieties with which some patients approach their dentists, and to evaluate and initiate research projects.

The use of hypnotic technics for these purposes[19, 20] seems worth while. Further clinical investigation and research, however, are needed. A good deal is now being done. The work of Ament,[21, 22] Burgess,[23] Heron,[22, 24, 25] Kornfield,[22] Moss[22, 26] and Stolzenberg,[27] to mention only a few of the outstanding teachers and workers in this field, is being read and studied by those actively engaged in evaluating the use of various hypnotic technics.

HYPNOTIC TECHNICS

Various hypnotic technics may be utilized to induce analgesia or anesthesia, by di-

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26. Moss, A. A. Hypnodontics, or hypnosis in dentistry. Brooklyn, N. Y., Dental Items of Interest Pub. Co., 1952.

rect verbal suggestion, once the patient has been hypnotized.[10, 28] Until the past decade and a half, hypnoanesthesia was induced primarily by direct commands to the effect that the patient relax, sleep deeply, feel nothing and be amnesic for the period of the operation. In addition, the patient's attention was diverted—or concentrated—elsewhere. Stage demonstrations, in which, for instance, needles are plunged into various parts of the body, usually make use of the direct suggestion that the subject become anesthetic.

But only 25 per cent of patients—percentages in the literature range from 15 per cent to 35 per cent—may be hypnotized deeply enough for hypnotic procedures such as these to be of value clinically to the dentist. It is relatively easy, however, to induce in a number of otherwise anesthesia refractory patients what, mistakenly, has been labeled a "psychological lobotomy." Some dentists during the past two years have been making use of this technic. When hypnotized their patients are told, in terms they understand, that no stimulus no matter how intense can possibly disturb them. They then react to pain stimuli in much the same way as patients successfully lobotomized for the control of severe, chronic and intractable pain, of which they remain aware and which they describe in the same terms as before, but which nevertheless no longer disturb, annoy, hurt or "pain" them.[10, 15]

A further word should be said about the use of the term "psychological lobotomy" to characterize this particular hypnotic technic. As Whitehorn states,[22] the analogy to a lobotomy is misleading since, despite statements in the literature to the contrary, authorities are still rather vague about the effects of the operation. No one, for instance, would characterize the hypnotically induced paralysis of an arm or a leg as the psychological equivalent of a pyramidal traction lesion—but the term "psychological lobotomy," ever since the author first introduced it in the literature,[15] has been used to describe this specific phenomenon.

So far as dental applications of this technic are concerned, Ament states[22] that the dentist should always so qualify his suggestions as to limit them specifically to the field of his competence. He therefore states to his hypnotized patient: "No stimulus, no matter how severe, can possibly disturb you—so far as your dental work is concerned." This qualification should be an indispensable condition whenever a dentist uses this hypnotic technic.

Other hypnotic suggestions may be proffered, among them the following: deep sleep, a coma so profound as to resemble a catatonic stupor, and posthypnotic trance states. It would be inadvisable for one without psychiatric training to utilize these.

Suggestions can be given for the performance of posthypnotic acts which result cumulatively in anesthesia or analgesia. Or the patient may be treated psychotherapeutically until he reaches the point, under hypnosis, of deciding exactly in what way and by what means, expressed or otherwise, he will disassociate to the point of developing such anesthesia.[3] If this is done, the hypnotist must be permissive, appreciative of the patient's behavioral patterns, and collaborate with the patient in helping him attain the specific goal of analgesia or anesthesia.[10]

If some of the lesser known but easily taught hypnotic technics are utilized, it may be more correct to refer to them as technics for the production of analgesia, since they permit sensation without pain and even may allow painful stimuli to reach conscious awareness as nonpainful experience.[22]

27. Stolzenberg, Jacob. Psychosomatics and suggestion therapy in dentistry. New York, Philosophical Library, 1950.

28. Wolberg, H. R. Medical hypnosis. New York, Grune & Stratton, 1948.

ADVANTAGES AND ALLEGED CONTRAINDICATIONS

Hypnoanesthesia with selected patients is as deep and as profound as chemoanesthesia. It has, for instance, recently been used for lung surgery.[29] If it were not so time-consuming and if all patients could be hypnotized deeply enough, it well could be the ideal anesthetic.[16] As a result of the pronounced dependency relationship which so frequently comes to the fore between patient and hypnotist, fear and anxiety on the part of the patient are dispelled. No preoperative medication is needed. The patient need not abstain from food. Salivation can be controlled; Stolzenberg's description[30] of the prune-like appearance of the buccal mucosa by hypnotic control of salivation during a surgical procedure seems worth studying. With some patients, mouth props and gags are unnecessary during hypnosis.[31] The anesthetic period can be made comparatively pleasant, maintained indefinitely and terminated at will. Bloodless fields can be produced, and there is neither operative nor postoperative nausea or vomiting. Anesthesia can be suggested for postoperative pain. None of the dangers usually ascribed to chemical anesthetics seem present.[32, 33]

Nevertheless, various contraindications have been alleged. Most seem part of the cultural superstition of today. Some require comment.

Alleged Contraindications • The belief that, in patients with cardiac disease, hypnosis may precipitate a heart attack has no experimental or clinical basis, unless the hypnotist is incapable of dealing with anxiety, whether using hypnosis or not, in which event he is incompetent and under no circumstances should be hypnotizing patients.[10] If the subject is a cardiac patient, a coronary attack may be precipitated if the dentist subjects the patient to effort demonstrations. This, however, is outside the dentist's sphere of competence, and cannot occur if the dentist restricts himself, in his contact with patients, to his dental work. Neutra's dictum[34] that postoperative shock is more pronounced and more frequent after hypnosis is not borne out by numerous descriptions of surgery in the literature, including a cesarean section[35] and a hysterectomy[36] successfully performed this past year under hypnotic anesthesia; neither do current theories of the etiology of shock provide a theoretical basis for Neutra's contention. So far as is known, no specific contraindications (at least of this type) exist to the use of hypnosis as an analgesic or anesthetic. Nevertheless, there are much more serious contraindications—and these are of prime importance to the dentist. For the most part they have not yet been described in detail in the literature.

Dangers • The hypnotic relationship, whatever else it is, is a relationship between two people. Not infrequently this relationship is of the same order as that which in intensive psychotherapy comes into existence months and even years after treatment has begun.[5] This relationship therefore has the same potentialities for therapy, and the same potentialities for danger, that the relationship theoretically has during the psychotherapeutic hour.[4] In other words, whoever makes use of hypnotism must know enough about human emotions, about the motivations of human behavior, and about himself not to deceive himself about what

29. Marmer, M. J. Role of hypnosis in anesthesiology. J.A.M.A. 162:441 Sept. 29, 1956.

30. Stolzenberg, J. Clinical application and hypnosis. J.Clin.Exper.Hyp. 3:25, 1955.

31. Stein, M. R. Anesthesia by mental dissociation. D. Items Interest 52:941 Dec. 1930.

32. Hollander, B. Hypnosis and anaesthesia. Den. Surgeon 29:239, 253, 1932.

33. Shaw, L. J. Hypnotism in dental work. Brit.J. Med.Hyp. 1:38, 1949.

34. Neutra, W. Hypnotische und post-hypnotische Analgesie. Wien.Klin.Wschr. 35:845 Oct. 1922.

35. Mandy, A. J., and others. Natural childbirth illusion. South.M.J. 44:527 June 1951.

36. Kroger, W. S., and DeLee, S. T. Caesarean-hysterectomy during hypnosis. J.A.M.A. 163:442 Feb. 9, 1957.

is going on in his patient, and not unwittingly, because of his desire to be of help, to harm rather than to aid the patient. Such harm can and does occur.

One out of every 12 of the general population at some time in the course of his life requires psychiatric treatment. This includes neighbors, friends, relatives and professional colleagues. This may sound like a high percentage; actually, it is not. Probably one out of every three or four of the general population requires some dental treatment, some medical treatment and some surgical treatment during his life. Just as many people can contract dental and medical disease, so large numbers of people may be subject to emotional disease.

The dentist has patients who have been, are now, or in the future will be under psychiatric treatment. Whenever a patient is to be hypnotized for dental purposes, the dentist should ask routinely whether the patient is under psychiatric treatment. If he is, permission should be requested to telephone the psychiatrist in order to determine whether hypnotic trance induction conceivably could be of danger to the patient.

Occasionally, and this is inherent in the nature of the hypnotic interpersonal relationship, a panic reaction may be precipitated merely on hypnotic induction, or a paranoic reaction or other psychosis manifest itself. In most instances this does not take place. Nevertheless, it may occur. The precaution of getting in touch with the patient's psychiatrist is of exactly the same order as that taken by the dentist who confers with the patient's family physician if the patient has heart disease, diabetes and so forth. If this is made part of routine history taking when hypnosis is under consideration, the patient will seldom object. Any problem which arises on this score will be of the dentist's making, not the patient's.

The Emotionally Ill Dental Patient • A number of patients have posthypnotic anxiety states which were precipitated while they were hypnotized by stage magicians, teachers, ministers, dentists, gynecologists, psychologists and even, improbable as it may seem, psychiatrists.[8] The problem here, however, is not insuperable; if a patient is hypnotized for dental purposes, and if during trance induction the patient becomes and remains upset, "nervous," tearful, sighing and tremulous, it would be best to cease hypnotizing that patient. Otherwise a severe homosexual panic, a catatonic schizophrenia or some other untoward reaction may be crystallized during trance induction and may persist after trance termination. But if the proposed precaution is observed, such problems need seldom or ever occur.

Occasionally a slightly different type of problem arises, primarily as a result of suggestions made either during trance induction or after the patient is actually hypnotized. One dentist, for instance, tells[22] of a patient whom he was treating orthodontically and to whom he had given a hypnotic suggestion to the effect that while she was in the dental chair she would feel as relaxed and contented as when on a cruise. To the dentist this suggestion obviously is a pleasant, relaxing one; he enjoys going to sea. To the patient, however, it was the opposite; she began gagging and vomiting. She had become seasick.

Each person interprets what he sees and hears on the basis of his own past experience and his present emotional tone. The dentist-hypnotist must, at least under certain circumstances, know what his patient's previous experiences have been. An eight ounce glass with four ounces of water in it is either half full or half empty, depending on how the onlooker feels at the moment. Every psychiatrist knows that each person can find enough in his real environment to justify doing, or not doing, exactly what he wishes to do or not do.

But each person also is a maze of con-

flicting desires and impulses. It is these desires and impulses which at times can cause trouble when the dentist makes seemingly innocuous hypnotic suggestions. It would seem inadvisable, for instance, unless a great deal is known about the past associations of a patient, to suggest that having a finger, a drill or anything else in his mouth will seem like having something pleasant or good or sweet placed in it. Some patients may grow as relaxed at this as though they were infants at their mothers' breasts. But an occasional patient—and no dentist possibly can know enough about a patient's sexual background to hazard even a guess about which of his patients this will be—may react as though this were couched in terms of the male sexual organ. Therefore the suggestion can be dangerous.

It was, for instance for a 17 year old patient who at the moment was struggling with latent, not conscious, homosexual drives. His dental work was uneventful. To the dentist, the suggestion seemed worth while. During the next several months, however, this boy began hypnotizing himself, always hearing the dentist's voice making the same suggestion. He gradually began to fantasy having fellatio forced on him while in self-induced hypnotic trance states. His overt anxiety on nonhypnotic levels began to increase, and when he ultimately was seen in psychiatric consultation he was rapidly approaching a panic state.

Whether or not this might have occurred if his dentist had not hypnotized him, if this particular hypnotic suggestion had not been made, or if his dentist had told him he could never hypnotize himself, it is impossible to state. In any event, in view of the anxieties with which he was struggling at the time of his dental work, this obviously was the worst possible suggestion that could have been given him. No dentist should ever make it, at any time, to a hypnotized patient. Innocent and innocuous as it sounds, it carries much too great a potential for harm.

Another danger—and this is much more serious because of the number of patients involved—is based on the fact that dentists (like most persons who begin making use of hypnosis) understandably are impressed with the melodramatic, magiclike effects of hypnotic suggestion so far as symptom disappearance is concerned.[2] Instead of limiting himself to the induction of analgesia or anesthesia, the dentist may try to be of help in areas in which he is completely untrained. He may suggest to his patients that they will cease biting their nails, that they will no longer eat or smoke to excess, that some apparently innocuous habit will disappear, or that they will feel happy. Such suggestions frequently take effect; frequently they can cause trouble.

One dentist, for instance, had a patient who showed mild anxiety. In an attempt to be of more than mere dental help to her, he suggested away her anxiety. A panic state, with hysterical phobic symptoms, immediately came to the fore. Psychiatric treatment had to be requested. Her acute symptomatology, fortunately for her, lasted only three weeks.

Another dentist tried to help a patient, after having extracted two of her teeth under hypnotic anesthesia, because of what he believed to be her mild depressive tendencies. She had complained of being "a little down at the mouth." He did not know that some years previously, after the birth of her only child, she had developed a postpartum psychosis for which she had been hospitalized because at the time she was suicidally depressed. Neither did he know that she had since had several so-called mild "schizo-affective episodes." He knew only that she felt mildly unhappy. So he told her, in an attempt to be helpful, that she would cease being depressed and would feel happy and even elated. This was while she was still hypnotized. This may have been one of the factors which later helped

make psychiatric consultation and treatment mandatory in order to prevent suicide on her part.

Such illustrations can be multiplied. They may be rare; nevertheless, they occur. Not infrequently, however, the severe psychiatric symptom may not manifest itself until days or weeks after symptom disappearance has been suggested under hypnosis—and as a result may not even be correlated with the hypnotic suggestion.[15, 37-39]

To the psychiatrist the threat of suicide —or even the suspicion of suicide—always must be treated as an emergency. Every 30 minutes, some one in this country kills himself. He may mean to, or he may misjudge the speed of the truck in front of which he hurls himself, or the strength of the dose of poison he takes. Some patients dissimulate their underlying depression so well that, to relatives, friends, neighbors and even to physicians and dentists, they seem not depressed but smiling, happy and well-adjusted. Many people make use of what is termed technically "reaction formation"; in other words, to keep from feeling as sad and as unhappy and as depressed as one actually is, one manages to run away from this fundamental unhappy feeling by seeming to be gay, happy and even contented. Neither their dentists nor they themselves may have any conscious inkling of what their underlying emotional tone is.

It is with patients like these, however, that one pronounced danger exists. With them, the hypnotic technic of intensification of emotion should never be utilized under any circumstances except by trained psychiatric personnel. At least two dentists before hypnotizing patients have asked them how they felt; when told "cheerful," or "happy," the dentists suggested to the hypnotized patients that while dental work was being done, their main feeling, whatever it was, would grow stronger and stronger until it became as strong and as intense as possible. For patients whose happiness and gayety mask an underlying depression, this suggestion can be a dangerous one. It should never be made. The dentist then will not run the risk of making suggestions on hypnotic levels to patients who later as a result may develop malignant depressive symptoms.

Symptoms, emotionally based, frequently serve a function. They may help hold in leash an underlying severe neurotic or psychotic reaction.[37, 39, 40] If so, trained and competent treatment is needed. The dentist is qualified, if trained in the utilization of hypnotic technics, to make use of such technics for dental purposes only; he is not trained and not qualified to treat symptoms emotionally based, any more than he is qualified to suggest away, as he can, nondental pain (which may, for instance, be the first symptom of a cancer) in a patient who has not yet seen a physician. The dentist may cause his patient irreparable harm if he steps beyond the fields of his competence.[8]

The dentist should suggest routinely to all his hypnotized patients that they will be unable to hypnotize themselves once they leave his office. This simple precaution, if employed routinely, should be more than sufficient.

Ament[22] advises his students routinely to give posthypnotic suggestions so that their dental patients "do not use these procedures on themselves or any one else." This is of prime importance. Stolzenberg[22] routinely gives a further posthypnotic suggestion to the effect that "no one except a practicing psychiatrist, a psychologist or a dentist will be able to hypnotize you, and for therapeutic reasons only."

37. Rosen, H. Discussion of article by Seitz, P. F. D. Psychosomat. Med. 15:422 Sept.-Oct. 1953.

38. Rosen, H. The hypnotic and hypnotherapeutic evaluation of the patient with torticollis. Unpublished.

39. Rosen, H., and Erickson, M. H. Hypnotic and hypnotherapeutic investigation and determination of symptom function. J.Clin.Exper.Hyp. 2:201, 1954.

40. Seitz, P. F. D. Experiments in substitution of symptoms by hypnosis. Psychosomat.Med. 15:405 Sept.-Oct. 1953.

Hypnosis is not a parlor trick.[41] Because some of the dangers involved in social demonstrations have not been brought to his attention, the dentist, along with the physician, may be inclined—because he considers it innocuous—to demonstrate his ability as a hypnotist at cocktail parties, conventions or social gatherings. Occasionally this can be exceedingly dangerous.

One student, for instance, was hypnotized by a fraternity brother who had watched a demonstration of hypnosis at a dental meeting. The student was seen professionally the next morning by the college psychiatrist because of the brief schizophrenic episode which came into existence at the time. It was believed that hypnotic induction and psychotic reaction were cause and effect.

A premedical student who was hypnotized as a stunt at a social gathering developed an anxiety reaction which forced him to miss school for several days. Some college students hypnotized another student who immediately went into a deep trance which they found impossible to terminate. A psychiatrist from a neighboring city had to be sent for to handle the problem. An acute psychotic reaction was crystallized in a latent homosexual by a dentist who had hypnotized him in his office one afternoon for dental purposes who later that evening met the patient at a cocktail party and rehypnotized him as a parlor trick.[8] His suggestion that the patient act like a woman ultimately necessitated psychiatric consultation.

Even if dangers are nonexistent, the use of hypnosis as a parlor trick by the dentist may lead not only to loss of prestige but—and this becomes a matter of professional ethics — may "make a mockery of serious business," as Ament states.[22] For the most part the codes of ethics of the Academy of Applied Psychology in Dentistry,[18] the American Hypnodontic Society,[15] the American Society of Psychosomatic Dentistry,[42] and of other bona fide dental groups whose members make use of hypnosis, hold it unethical for members at any time to hypnotize patients for any but professional purposes.

In a number of the instances cited here for illustrative purposes, trouble ensued primarily because the dentist was not sufficiently aware of the motivational bases of human behavior. Although adverse and untoward reactions have been stressed, dentists should be acquainted with the various hypnotic technics, whether or not these are made use of, and instruction in their use should be under the organizational aegis either of the various dental schools or of the county and city dental societies. Hypnosis then no longer would be considered as magic. Sufficient instruction in personality dynamics could be integrated into the course. Potentialities could be taught, but complications and how to avoid them would be emphasized.

Supplementary courses on the subject could be given those dentists who have learned hypnotic technics from books, from lay hypnotists and from professional entertainers. Supervised work could be arranged with patients, but this supervision should be exacting.

It is to be regretted that a number of hypnotists, dentists among them, hypnotize friends, acquaintances and patients—any one, in fact, misguided enough to let them do this—and sadistically suggest the performance of humiliating acts in order to provoke a laugh from the audience and thereby increase the hypnotist's sense of self-importance. These hypnotists are emotionally ill and in need of psychiatric treatment. They exploit the hypnotic interpersonal relationship to further their own sadistic drives. They no more should be hypnotizing patients than

41. Leighton, Isabel. Hypnosis is not a parlor game. McCall's Sept. 1956.

42. American Society of Psychosomatic Dentistry. Constitution and bylaws as revised and adopted at Chicago meeting, Feb. 1953.

they should be giving them marijuana or otherwise maltreating them.

The Emotionally Ill Hypnotist • During the past ten years more than a hundred hypnotist colleagues have been seen by the author. Forty-three were dentists, one was a psychologist, four were psychiatrists, and the rest were medical colleagues.

They requested these appointments for various reasons, most of which were pretexts which they themselves did not credit. Such reasons, nevertheless, afforded face-saving rationalizations for psychiatric consultation or evaluation without making it necessary for them specifically to request this. The majority wished to know how it felt to be hypnotized. Some were unable to hypnotize as many patients as they thought they should, and wished to learn how. Others wished advice on how to proceed because of what had developed when they had hypnotized specific patients, wives, mothers, children or friends.

Some wished to demonstrate the value of autohypnosis as practiced by themselves. Some applied for treatment on hypnotic levels because of their mild stutter, their tremulousness, their feelings of inadequacy, their inability to turn delinquent accounts over to a collection agency, their feelings of fatigue or depression, their sexual inadequacy or their sleeplessness.

In other words, these dentists applied for appointments for exactly the same reasons as do cabdrivers, typists, chemists, secretaries and physicians. More recently, however, because of the Bridey Murphy hysteria, some dentists and some physicians have tried to maintain that they were sending hypnotized wives, sweethearts and patients back to former existences.

All four dentists who tried to convince the author of this were ill emotionally. On psychiatric examination they were found to show socially and professionally compensated schizophrenic reactions with dissimulated paranoid or catatonic elements predominating. The material incorporated in the current Rex Morgan comic strip, for which the author acted as consultant in hypnosis, although fictional, is based on fact. The only would-be Bridey Murphy among the dentists seen by the author, who on hypnotic induction spontaneously regressed to a so-called previous existence, did so on an hysterical basis, and was evidencing a "multiple personality." If any colleague believes that he has actually regressed other individuals to former lives, he should cease immediately to hypnotize patients. This belief of his may be based merely on lack of knowledge; in this event he needs further training before he can be entrusted with patients on hypnotic levels. On the other hand, his belief may be one symptom—perhaps the only obvious symptom—of neurotic or psychotic illness; in this event, psychiatric consultation, evaluation and treatment are indicated.

Instruction in the subject of hypnosis, wherever and whenever it is given, must be so organized as to screen ill applicants, and to steer others to psychiatric examination and treatment when indicated. This can be arranged readily, without subjecting either student or instructor to undue embarrassment.

The fact that a particular dentist-hypnotist may now be, or previously has been, emotionally ill does not of itself imply that he should cease practicing his profession, nor does it mean that he should discontinue hypnotizing patients. His illness may be on any level. It may be mild or severe. It may or may not interfere with his professional, social and personal life. It may at times even result in an increase in professional competence, since some patients with emotional illness who are or have been under treatment are as a result more effective, more efficient and more capable than those equally ill colleagues who despite their need for therapy lack such treatment.

Self-Hypnosis (Auto-Hypnosis) • Physicians and dentists in constantly increasing numbers are now unqualifiedly recommending self-hypnosis. They hypnotize their patients and give them posthypnotic suggestions to the effect that, later on when they wish, they can hypnotize themselves. These hypnotists believe that, since mere verbal suggestion under hypnosis can so frequently induce what on the surface seems magic, self-hypnosis must be well worth while. Unfortunately, there is little in the whole field of psychodynamics with so great a potential for harm.[9] Still more unfortunately, some authorities on other phases of hypnosis see no objection to this practice.

Nevertheless, self-hypnosis should never be attempted unless the individual who wishes to practice it has had an intensive multisession psychiatric evaluation and, when indicated, psychological testing by projective methods. Otherwise, the danger can be too great. The desire for self-hypnosis, whatever the rationalization advanced by its practitioner, frequently is a desire to further fantasy formation, to facilitate sinking deeper into a dream world, and to indulge in fantasied or actual acting out of a type not otherwise allowable to the individual and for which, as a result, he may posthypnotically be amnestic. Although self-hypnosis may be used for constructive purposes, it can be utilized self-destructively.

Until a great deal more is known about hypnosis, it would seem inadvisable for the dentist to use recordings to hypnotize patients, just as it seems contraindicated for him to suggest to his hypnotized patients that they will be able to hypnotize themselves later on as they wish.

PRECAUTIONS AND RECOMMENDATIONS

No dentist would administer nitrous oxide without knowing its potentialities and value, and its contraindications. No dentist would allow himself to be taught how to use nitrous oxide—or any other anesthetic—by a nondentist, a nonphysician or a nonprofessional. A fairly large number of dentists make use of hypnosis as an analegsic or anesthetic, however, with some knowledge of its potentialities but with no knowledge of its dangers. Some of these dentists have found themselves precipitated into serious trouble. Suicidal depressions have come to the fore, emergency psychiatric consultation has had to be arranged even from the dentist's office, and psychiatrists occasionally have had to take care of overt psychotic reactions which had been unleashed by inept or untrained handling, although not purposely so, of the hypnosis.

It has seemed of prime importance in this paper to stress the dangers involved. With a knowledge of these, with competent instruction under the aegis of the dental schools or the city and county dental societies, there is no reason why dentists should not utilize, to a progressively greater degree, hypnoanesthesia in their attempt to control the severe pain from which their patients suffer. If the dentist does not try to suggest away symptoms that are neurotically or psychotically based, and restricts the use of hypnosis to the induction of analgesia or anesthesia, remembering not to hypnotize patients who show anxiety reactions during the induction process, remembering also to suggest to those patients who have been hypnotized that after they leave the dental office they will be unable to hypnotize themselves, there is no contraindication to the use of hypnosis by the dentist.

More than mere ability to hypnotize patients is necessary, however. Almost any person can be taught this. First, some knowledge of the motivational bases of human behavior must be acquired. Supervised work, primarily by dentists with dentists, is necessary. The dentist at present is trained to make use of sedation, analgesia and anesthesia, in his attempts

to allay the pain and the apprehension of his patient. Therefore he is qualified on the basis of his past training to use hypnotic technics likewise for sedation, analgesia and anesthesia. When, however, without further training he attempts directly to undercut the anxiety which his patient may show, he may or may not be beyond his depth.

Since what the patient shows in the dentist's office for the most part is conditioned by the real situation, the dentist will of course wish to allay his patient's apprehension and anxiety. This can be attempted on hypnotic levels. It is in this area, in fact, that the use of hypnotic technics will seem most valuable.

No problem exists if this anxiety stems only from the dental situation. But if this anxiety stems from earlier life situations, it may be dangerous. For this reason dentists who make use of hypnosis need further instruction in the motivational bases of human behavior.

Preferably this instruction should be under the aegis of dental schools and dental societies, and not of stage entertainers (as it so frequently is) who make unwarranted claims, sometimes with almost religious fervor, of the magic that can be accomplished once the dentist learns the technic of hypnotizing his patients.

Supervised work with patients should be part of the instruction. This must be in small groups. Attempts should be made to determine whether the patient is under psychiatric treatment. In any event, no patient should be hypnotized except for dental purposes. Under no circumstances should the dentist attempt to handle nondental problems on hypnotic levels.

If the dentist is under psychiatric treatment, he should first ask his psychiatrist whether, in view of his own emotional problems, it would be advisable for him to approach patients on hypnotic levels. If he believes in hypnotically induced reincarnation and believes he has regressed patients to previous lives, under no circumstances should he be using hypnotic technics; he is either emotionally ill or unaware of the implications of what he is doing. If he feels he must hypnotize every patient, or if he makes much use of self-hypnosis, instead of hypnotizing patients he should apply for psychiatric consultation.

1101 North Calvert Street

Our Mouths • In recent years dental bacteriology has grown up and it is certainly not the least important part of bacteriology. We get our mouths infected with a variety of bacteria almost as soon as we are born and our mouths remain infected until we die. For the most part we are quite unaware of the infection. It is simply what we call normal but every now and again something happens which reminds us that bacteria are there. It may be that one of the usual inhabitants finds conditions just suited for it to wake up to increased activity or it may be that a fresh microbe blows in to which the mouth is not acclimatized. *Arthur Fleming.*

JUNE 1957

LON W. MORREY, D.D.S., EDITOR
VOLUME 54 • NUMBER 6
Published by the American Dental Association
222 East Superior Street • Chicago 11, Illinois

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

Hypnosis in dentistry: new light on an old subject

Hypnosis, that long disputed member of the health professions family, is discussed extensively in this issue of THE JOURNAL. Three articles on the subject, one dealing with hypnosis in dental medicine by Kline; one on hypnosis in dental therapeutics by Kuhner and one on the potentials and dangers of hypnosis by Rosen, present various aspects of one of the most controversial subjects in dentistry. Whether one agrees or disagrees with the proponents of hypnosis, or whether one approves or disapproves of its use in dentistry, he will find these three papers worthy of his reading time because of the new light which they throw on an old subject.

Hypnotism in one form or another has been known and used as a means of healing since the early days of civilization. "Its induction and practical control[1] were well understood long before the present period in which the treatment of mental disorder has become part of the province of medical science."

There is no question but that some people—including some dentists—have become quite proficient in the art of hypnotism—particularly in the art of inducing analgesia and anesthesia. There is some question, however, regarding the advisability of superficially trained hypnotists practicing the art without discrimination, without realization of the emotional forces released and without knowledge of the patient's psychological background.

One of the principal reasons why hypnosis has not been accepted more readily by the profession is that dentists, for the most part, recognize it as a profoundly serious psychological phenomenon—not a procedure that may be learned in four or

six or a dozen easy lessons. As Kline points out, hypnosis is part of an "organization of behavior" process. "All who aspire to its proficient application must have a thorough understanding of the dynamics of human behavior. Hypnosis cannot be taught or utilized as an independent device unless the operator has a well developed background in psychodynamics and medical psychology." Very few dentists are privileged to have that background and very few can take the time to acquire it. Certainly hypnosis cannot be learned satisfactorily by reading a few books or by attending a few clinics. It must be learned as other specialties are learned—from qualified, recognized teachers. Although Rosen suggests that such instruction be given preferably under the aegis of dental schools and dental societies, no dental school today and no dental society is prepared to undertake such teaching.

Dentists who are inspired to add hypnosis to their armamentarium would do well to equip themselves properly by completing a basic course of training in psychology including as Rosen suggests "instruction in the motivational basis of human behavior." Dentists who so equip themselves and who add hypnosis to their treatment methods must realize, however, that the art of Mesmer is no panacea. Practitioners competent in its use will find it helpful in the relief of the patient's anxiety and tension. But even they will have to rely on the usual form of anesthetics for the prevention and relief of pain.

1. Medical use of hypnotism. Report of a Subcommittee appointed by the Psychological Medical Group Committee of the British Medical Association. British Medical Journal Appendix X April 23, 1955, p. 190.

National Board dental examinations: interest among dentists grows greater each year

The month before last, four thousand seven hundred and thirty-two students of the nation's dental schools took the National Board dental examinations—the largest number to take the tests since the program was initiated in 1933. Two thousand five hundred ten candidates took Part I, which consists of a written examination in sciences basic to dentistry, and two thousand two hundred twenty-two took Part II, which consists of a written examination in the theory of clinical subjects. A year ago in April, 2,122 candidates took Part II of the examination. In 1955 there were 2,005 candidates and in 1954 there were 1,715. During the 24 years that have elapsed since the program was initiated 11,634 dentists, or approximately 13 per cent of the active practitioners in the United States, have acquired National Board Certificates.

Each year the number of candidates for the National Board examinations increases, which is a tribute to the worth of the program and attests to its acceptance by the profession—particularly by the younger members of the profession. During the first five years that the program was in operation, that is, from April 1933 to December 1937, only 312 dentists took Part II of the examination. Twenty years later, during the three years between April 1954 and December 1956, 7,567 dentists or 24 times the number in the original group, took Part II. The merit and desirability of the program also is reflected in the fact that thirty states, two territories and three federal agencies accept the National Board Certificates and grades and four additional states are taking steps to do so. One state—Pennsylvania—has replaced its own written examinations with those of the Council of the National Board of Dental Examiners.

It is not unrealistic to predict that in the near future full recognition will be given by all states to the National Board Certificates. One strong argument in favor of such recognition is that it would relieve the State Boards of Dental Examiners of the arduous and thankless task of preparing, conducting and grading written examinations and enable them to devote more time to the examination and evaluation of the candidate's operative ability.

The unreserved acceptance by recent graduates of the program of the National Board of Dental Examiners together with the more restrained but nevertheless increasing acceptance by the states argues well for its future. Certainly the trend is toward nation-wide acceptance of the program. Such acceptance should provide a sane and logical solution to the many problems inherent in a program of unrestricted reciprocity, and it should go a long way toward ameliorating the differences of those that defend and those that oppose the philosophy of state rights.

Patient radiation exposure in dentistry reduced by aluminum and copper filtration

The wave of concern that swept the profession last year following the U. S. National Academy of Sciences report on the biological effects of radiation has substantially subsided. The potentials of overradiation, however, are little changed. There are not many data available in the literature regarding the amount of roentgen-ray radiation falling on the lower abdominal region during a full-mouth roentgenographic survey. Some values as high as 5.6 r have been reported. Excessive roentgenographic radiation should be avoided, and manufacturers have taken positive steps to equip the newer x-ray machines with safeguards which permit a minimum of radiation exposure.

There still remains the problem presented by the older but serviceable x-ray machines of which there is estimated to be some 75,000 throughout the country. How can their radiation output be reduced without rebuilding the machine at great expense and without injuring the quality of the roentgenograms.

Yale and Goodman seem to have provided a practical and inexpensive solution. Those who missed their short article in the March 1957 issue of THE JOURNAL are referred to "Reduction of Radiation Output of the Standard Dental X-Ray Machine Utilizing Copper for External Filtration" on pages 354-357. The authors state that by the addition of 0.375 mm. copper and 0.5 mm. aluminum filters to a standard dental x-ray machine operating at 10 milliamperes, 65 kilovolt peak at a two second exposure with high-speed film they reduced the effective tissue dose from 7.2 r to 0.24 r, an approximate reduction of 96.7 per cent. Comparable results were achieved with a 15 milliampere, 90 kilovolt peak dental x-ray machine when equipped with conventional aluminum filters at a 1/20 second exposure with high-speed film. Since the change-over can be made easily and inexpensively and with no reduction in the quality of the roentgenograms, most dentists will want to consider favorably adding the copper-aluminum filters to their older x-ray equipment and thus reduce radiation hazards to a minimum. The chances are that the average dental dealer will not stock these filters, but he should be able to procure them from the manufacturers of the machines.

International Correspondence

NEWS FROM GREAT BRITAIN

The new department of dental science of the Royal College of Surgeons of England under the direction of Sir Wilfred Fish is slowly taking shape in its temporary quarters where it will be until the new building is completed.

The accommodations will provide laboratories for histology and pathology, radioactive isotopes, photography and biochemistry and an animal room. A long-term program of research has been planned. The whole undertaking is maintained completely by voluntary subscription and donations from the commercial world of Great Britain.

The fourth Guy Memorial Lecture of the Royal College of Surgeons of Edinburgh was delivered by Mr. Charles Henry Kemball. The subject was dental education in Edinburgh from 1889 to 1929, the time in which William Guy influenced and guided the development of the famed Edinburgh dental school.

BRITISH DENTAL ASSOCIATION

G. A. Lammie spoke recently before the central counties branch of the British Dental Association on his impressions of the United States. He had been privileged to be associate professor of dentistry at Northwestern University Dental School during 1956. Dr. Lammie compared the life of the student in the American dental school with that of the student here and explained how the emphasis seemed to be on becoming masters of technics, which has certain disadvantages.

He felt that the system of training developed excellent dental surgeons who used the very best materials, thanks to the influence of the Bureau of Standards. As regards future developments, he was of the opinion that they lay in the direction of high speed cutting of dental tissue, up to 160,000 rpm when vibration was eliminated.

R. D. Emslie spoke before the East Lancashire and East Cheshire branch on his views on periodontal practice. Dr. Emslie also had returned from a visit to the United States. He said that in the United States periodontology is a specialty requiring two years postgraduate training and that the demand for this specialist service is considerable. Much research is being carried out, and there is considerable difference of opinion on many points. Dr. Emslie discussed diagnosis and treatment, and his paper was illustrated by excellent slides.

PARLIAMENT

In a debate on the shortage of dentists, it was stated that although there has been a small increase in the number of dentists since 1924, the ratio of population to dentist remains almost the same, and in 1956 stood at one dentist to 3,336 of population. The volume of treatment given under the general dental services is still increasing, and the number of courses of treatment in 1956 showed an increase of 8 per cent over 1955.

As the number of dentists practicing increased in the same period by only one and a half per cent, it is obvious that dentists are working longer hours and with more efficiency to achieve this welcome increase. The greater part of this increase is benefiting patients under 21.

The crisis in dental manpower now approaching is due largely to the coming retirement of about 2,500 dentists who came into the profession under the 1921 Act. Dentistry is not, however, the only profession facing a manpower problem. The problem faces the teaching, scientific and engineering professions as well.

The Minister of Health was asked what was the annual cost of the repair of dental appliances, what evidence he had found of deficiency in the technical processes or in the materials used and whether he was satisfied that money spent in research and development would not result in some economy.

In a written reply, the Minister said that repairs cost about £1,000,000 a year in England and Wales. He had no evidence suggesting that undue expenditure on repairs was being caused by deficiencies in the technical processes or materials used.

In a written answer on February 25, the Minister of Health said that the total cost of the National Health Service for Great Britain in 1949-50 was about £450,000,000, of which £345,000,000 was met by the Exchequer. The corresponding figures estimated for 1957-58 were about £690,000,000 and £550,000,000, respectively. Allowing for the fall in the purchasing value of the pound between the

two dates, the 1957-58 figures are the equivalent of £515,000,000 and £410,000,000 in terms of the 1949-50 value.

ITEMS OF INTEREST

The fifth annual meeting of the British division of the International Association for Dental Research was held at the Postgraduate Dental Institute (Eastman Dental Hospital) London April 11 and 12. This was the first time the meeting took two days.

The membership of the division has passed the 50 mark, but pending receipts of notice of elections at the Atlantic City, N. J., meeting, the exact figure is not yet known here. Many members exercised their right to invite one guest, so that approximately 90 members and guests attended. After five years as councillor, Prof. Martin Rushton resigned but was re-elected. A cable of greetings from the president of IADR, Reidar Sognnaes, was greatly appreciated. Thirty-four papers were read, and seven demonstrations of research results were displayed.

The meeting was probably the best which has yet been held. It showed a steady improvement in the level of presentation and in the quality of work presented. Two presentations by students of Guy's Hospital Dental School were accepted, and it is hoped that a small number of students' presentations will become a regular feature of the meeting. The division is performing a valuable service in encouraging the younger members of teaching staffs in dental schools to carry out and present research in dental science.

The annual conference of the British Dental Students' Association is to be held in Birmingham for five days beginning July 22. The students' association is now representative of every dental school in Great Britain, a fact which will strengthen its position at the annual congress of the International Association of Dental Students to be held in August of this year in Oslo, Norway.

Prof. T. Talmage Read has been elected president of the Dental Implant Society of Great Britain. He spoke on subperiosteal dental implants at a meeting held at the Royal Society of Medicine, and he also introduced a new film on the subject entitled "Operative and Laboratory Techniques," made by Mr. Boris Trainin.

Douglas Derrick was installed as president of the American Dental Society of London at the annual meeting in April. He succeeds Sidney Rosenberg.

The British Society for the Study of Prosthetic Dentistry had its annual meeting at the Eastman Dental Hospital, London, April 4 and 5.

The Continental Dental Society held its spring meeting in May at the Royal College of Surgeons. Lectures were given by Prof. Reichborne-Kjennerud from Oslo University on periodontics, by Dr. K. Lidderlow on prosthetics, and by Dr. Ward on the temporomandibular joint. There were also chairside demonstrations on a simplified impression technic, and spring bridges and a new apparatus enabling an impression to be taken in edentulous patients.

An interesting development in dental health education is the insertion by the Oral Hygiene Service of a full-page advertisement in the March 22 issue of the *Worlds Press News*. The Service was founded in 1952 with the help of the dental profession. Its advertisement is one of a series which gives information on important subjects. Answers are given to questions such as: what is oral hygiene, what causes dental decay, what is meant by a correct diet, and do toothpastes help? The series, of which this is number two, is intended to provide a useful service for journalists, editors and librarians.

The many friends of Ted Duckworth will mourn his sudden death in March. Duckworth was a man of vivid personality who devoted his entire energy to any work he undertook. He was an implacable opponent of the Health Service in the form in which it was thrust on the profession. He was one of those who believe that complete union of the profession is necessary, and he had the satisfaction of knowing that his work within the group movement was a major contribution to the achievement of amalgamation.

Gerald H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

Association Affairs

DENTAL GROUP TO STUDY MEDICARE PROGRAM

A study of the dental aspects of the Armed Forces Dependents' Medical Care Program will be undertaken by a committee composed of the members of the dental advisory committee to the Department of Defense, and representatives of the American Dental Association, of the Surgeons General and the insurance industry.

The coming study was announced at a meeting of the Dependents' Medical Care Advisory Committee in Washington, D.C., May 17. The advisory committee met to review the first five months' operation of the Medicare program and to discuss problems yet to be solved.

The special study group will consider possible revisions or additions to the list of dental procedures now deemed necessary adjuncts to medical or surgical treatment. Only adjunctive dental care is reimbursable under the Medicare program.

Two other aspects of dental care will be evaluated by the advisory committee itself. The first is: shall the joint directive under which the program operates be amended to permit payments directly to dentists rendering care under the Act? At present, only physicians may authorize dental care. The second question is: shall dental care be authorized which is rendered as part of complete obstetrical and maternity service?

Dental representatives meeting with Maj. Gen. Paul I. Robinson, Medicare director, were: Harry Lyons and William R. Alstadt, members of the Medicare advisory committee; Thomas P. Fox, John C. Brauer and F. J. Reichmann, members of the dental advisory committee to the Department of Defense; the military dental chiefs, Maj. Gen. James M. Epperly, Brig. Gen. Marvin E. Kennebeck and Rear Admiral Ralph W. Malone; Rudolph H. Friedrich, secretary, American Dental Association Council on Dental Health, and Bernard J. Beazley, secretary of the Association's Council on Federal Dental Services.

HOUSE PASSES ASSOCIATION APPROVED DOCTOR DRAFT BILL

House of representatives on May 23 approved a bill replacing the six and a half year old physician-dentist draft act. The new bill, while continuing to place physicians and dentists in a special call up category, limits call ups to those liable for service under the regular draft law. The measure, which next goes to the Senate for action, contains virtually all American Dental Association recommendations.

The House bill, H.R. 6548, was drawn up by its Armed Services Committee as a substitute for a Department of Defense version and includes provisions urged by the A.D.A. but omitted in the Defense Department version. The committee bill was supported by J. Claude Earnest, chairman of the A.D.A. Council on Legislation, when he testified before the committee May 8. In major provisions, the bill:

1. Authorizes the selective call up of nonveteran dentists and physicians to age 35. The old bill allowed call ups to age 46. It is expected that quotas will be filled from recent graduates as the number of available graduates exceeds the present needs of the Armed Forces.

2. Preserves the advisory committees to Selective Service. Continuation of

these committees was urged at the May 8 hearings by dental and medical witnesses. The Defense Department bill made no provision for them.

3. Eliminates from liability for induction those who apply for commissions and are rejected solely for failure to meet physical standards.

4. Requires the commissioning of dentists and physicians in grades commensurate with their professional education and experience.

5. Permits reservists to resign their commissions on fulfillment of 12 months of active duty.

The measure, if passed by the Senate as expected, will take effect July 1 of this year. It will terminate July 1, 1959.

A.D.A. SAYS FTC RULES SHOULD NOT USE TERM "ARTICULATION"

A statement filed with the Federal Trade Commission by the American Dental Association objects to the proposed use of the term "articulation" as a substitute for the term "occlusion" in the proposed *Rules for the Commercial Dental Laboratory Industry.* The substitute word "articulation" was proposed by the National Association of Dental Laboratories, which agreed with the A.D.A. at hearings last February that the term "occlusion" should be eliminated from the *Rules.*

In the Association statement, Mr. Renah F. Camalier, Association special counsel, proposed that the term "occlusion" be eliminated altogether and no substitute included, or, if the term "articulation" is used, that it be modified to read "mechanical articulation."

ASSOCIATION CALLS FOR NIDR BUILDING AT SENATE HEARING

Appropriation of funds to construct a building for the National Institute of Dental Research was called for last month by an Association representative in testimony before a Senate appropriations subcommittee. The committee was considering the budget for the Department of Health, Education and Welfare, which contains the funds for dental health activities of the U.S. Public Health Service. The proposed budget provides $6,430,000 for these activities.

Thomas J. Hill, chairman of the Council on Dental Research, appearing before the committee May 6, recommended a 3.7 million dollar appropriation for the NIDR building, pointing out that research at the NIDR is severely handicapped by inadequate space.

Terming the need "critical," the noted researcher reminded the committee that Congress itself had previously recognized the need for the building when it authorized a four million dollar expenditure last year. A budget request by the U.S. Public Health Service for the funds was deleted in the Administration's economy drive.

"Dental diseases are so complex in their causation," Dr. Hill said, "that successful research on these problems requires the combined and coordinated knowledge and skills of many scientists . . . Only in an adequately housed, equipped and staffed National Institute of Dental Research can all these workers and their efforts be fully coordinated in an effective assault on major dental problems," he said.

Dr. Hill recommended also an increase of one million dollars in the proposed appropriation for the extramural program of the NIDR. He proposed that half the increase be designated for research project grants in schools and research centers and that half be allocated for the training of additional researchers.

The present bill provides $2,825,000 for the extramural program, an increase of $125,000 over last year; the appropriation for training of researchers remains the same.

In calling for the increase, Dr. Hill pointed out that the proposed appropria-

tion would be largely exhausted in supporting existing projects and that additional needed research could not be carried out. Last year, he reported, NIDR was supporting only 51 projects in 22 institutions. Today, it supports 275 in 75 institutions. "This healthy interest and extraordinary progress in dental research deserves to be maintained and heightened," he asserted.

Additionally, the training of researchers should receive increased support, the scientist said, as "the expansion of this nation's health research efforts depends primarily upon increasing the number of competent and devoted research scientists." Dr. Hill urged the Congressmen to support "research which may lead to the preventive solution of diseases afflicting our entire population. This is economy of the highest type," he declared.

JOHN CARR REPRESENTS A.D.A. AT CIVIL DEFENSE MEETING

John Carr of Camden, N. J., a member of the Committee on Civil Defense of the American Dental Association's Council on Federal Dental Services, will represent the Association at the Fifth Annual National Medical Civil Defense Conference June 1. The meeting is at the Hotel Waldorf-Astoria in New York City. It is sponsored by the Council on National Defense of the American Medical Association and will consider the medical aspects of the hazards of radiation and radioactive fallout.

HOUSE OF DELEGATES TO VOTE ON CERTIFICATION PLAN

A proposed plan for the certification of dental laboratory technicians will be submitted to the American Dental Association House of Delegates when it meets in Miami, Fla., this November.

The general outline of the plan, proposed at a conference between representatives of the Association and the National Association of Dental Laboratories in Chicago May 10, provides that educational aspects of the plan would be the responsibility of the A.D.A. Council on Dental Education, and the administrative aspects that of the N.A.D.L. The conferees emphasized that no plan would become effective until voted on by the House of Delegates of each organization. If approved this fall, the certification plan could begin at the end of 1957 or early in 1958.

The plan proposes that the educational phase of the program consist of one formal year of education in an appropriate institution and the equivalent of one year of supervised training plus three additional years of practical experience. The supervised training and practical experience might be obtained by the technician in a dental laboratory.

The May conference was the third between the two organizations. Harry Lyons, president of the A.D.A., presided.

Attending the conference were Mr. Nathan Cooper, president, and other N.A.D.L. representatives, Mr. Horace Denner, Mr. Homer Dickson, Mr. Kelley E. Griffith, Mr. Paul L. Jones, Mr. George Klein, Mr. Arthur Koorse, Mr. Don Neuenschwander, Mr. Ralph Rothstein, Mr. Paul A. Slone, Mr. G. Paul Stough and Mr. Victor Van Fleet.

American Dental Association representatives in addition to Dr. Lyons were: Mr. Herbert Bain, Mr. Bernard Beazley, Herbert Bunker, Mr. Bernard Conway, Walter E. Dundon, J. Fred Folley, Jr., Harold Hillenbrand, Maynard K. Hine, Paul Jeserich, Carl Laughlin, Lon W. Morrey, Shailer Peterson and Mr. Reginald Sullens.

At the close of the conference, the following joint statement was issued:

> The conference between representatives of the National Association of Dental Laboratories and of the American Dental Association, at the Central Office of the American Dental Association, Chicago, on May 10, considered reports of working parties on the educational and administrative aspects of a program for

the certification of dental laboratory technicians.

It was agreed that the educational aspects of a certification program would be the responsibility of the Council on Dental Education of the American Dental Association. The educational phase of the certification program would consist of one formal year of education in an appropriate institution, and the equivalent of one year of supervised training plus three additional years of practical experience. It was agreed that this training and experience could be conducted in a dental laboratory or in other institutions. On the completion of the five-year period of education and experience, the candidate would become eligible to apply for certification in a general or particular field of dental laboratory technology.

The representatives of the Council on Dental Education indicated that the Council would submit to the 1957 session of the House of Delegates a statement on the "Requirements for Educational Programs for Dental Laboratory Technicians." If these "Requirements" are approved by the House of Delegates of the American Dental Association and accepted by the House of Delegates of the National Association of Dental Laboratories, the program could be initiated at the end of 1957 or early in 1958.

The conferees agreed that the certification program for dental laboratory technicians would be established under general principles advanced by the Council on Dental Education of the American Dental Association as "Requirements for the Approval of a Certification Board for Dental Laboratory Technicians" which would be submitted to the House of Delegates of the American Dental Association at its annual session in November, 1957 and which would also be considered by the House of Delegates of the National Association of Dental Laboratories at its annual session in October, 1957.

Under the proposed program, the National Association of Dental Laboratories, or an agency of its choice, would develop and implement the administrative mechanisms for the certification of dental laboratory technicians. It is proposed that the program would provide for the certification of dental laboratory technicians in the general field of dental laboratory technology and in the individual fields of complete dentures, partial dentures, dental ceramics and crown and bridge technology. Other details of the certification procedure would be developed by the certification agency.

Representatives of both associations emphasized that the certification program would not be initiated until action has been taken by the governing bodies of both associations.

The conferees also agreed that each association will continue its studies of plans for establishing an acceptable program for the recognition of dental laboratories.

FORUM TO BE MAJOR TEACHING METHOD OF ESSAY PROGRAM

Group presentation rather than individual essays will be the major teaching method used in the essay section of the scientific program for this year's annual session, according to Charles S. Kurz, chairman of the Council on Scientific Session.

One and two day forums, designed to provide more comprehensive coverage of their subject and similar in format to a refresher course, will be used for the first time. There will be three of these forums and 14 half-day panels. The individual essay, prominent in previous scientific sessions, will appear only five times in the four day program. As in previous years, projected clinics, table clinics, motion pictures and exhibits will complete the session.

First of the forums, scheduled for the entire day Monday, is entitled "Anesthetic Drugs and Technics in the Dental Office." Five participants and a moderator will discuss the newer local and general anesthetics, the proper selection of anesthetic agents, prevention and treatment of reactions to anesthesia and management of the handicapped or apprehensive patient.

Moderator of the panel is Adrian O. Hubbell of Long Beach, Calif., noted oral surgeon. Panelists are: Stanley C. Harris of Chicago; Harold W. Krogh of Washington, D.C.; Leonard Monheim of Elizabeth, Pa., and Boyd F. Sprague of Portland, Ore. The fifth panelist will be announced later.

Two half-day panels of interest are "X-radiation in the Dental Office" (Monday afternoon), and "Occlusion" (Thursday morning). Panelists on Mon-

day will consider the genetic and pathologic effects of roentgen rays, protection for patients and office personnel and the reasonable use of radiation in the dental office. Equipment useful for determining the amount of radiation present in the dental office will be demonstrated.

Panelists on Thursday will discuss problems of occlusion in operative dentistry, in partial prosthodontics, in temporomandibular joint disorders and in orthodontics.

HAROLD HILLENBRAND AMONG SEVEN CITED BY LOYOLA

Harold Hillenbrand, secretary of the American Dental Association, was one of seven individuals to receive Loyola University Alumni Citations May 19. The specially-engraved plaques are awarded those whose "outstanding careers" exemplify the ideals of the university. Dr. Hillenbrand has been secretary of the Association since 1946. Prior to that he was editor of THE JOURNAL and served on the faculty of Loyola University's dental school as associate professor of ethics and social relations. He is a 1930 graduate of the dental school.

PERRY SANDELL APPOINTED ADVISER TO HEALTH MUSEUM

Perry Sandell, director of the American Dental Association's Bureau of Dental Health Education, has been appointed to the advisory committee on dental health exhibits of the Cleveland Health Museum.

The museum, which opened in 1940, was the first health museum in the country. Its health education materials are used widely not only in Cleveland's classrooms, but in hospitals, universities and by health foundations. A weekly series on television is among its activities. It builds health exhibits for use by other organizations; its own exhibits circulate in elementary and high schools. Additionally, the museum has an extensive collection of films, photographs, clippings, books and periodicals.

INSTITUTE LISTS 25 HEALTH LEADERS AS PARTICIPANTS

The institute-workshop on hospital dental service sponsored by the American Dental Association and the American Hospital Association in Washington, D.C., June 17-19 lists as program participants 25 leaders in the dental, medical, hospital and nursing fields.

Greetings to the meeting, the first of its kind to be sponsored by the A.D.A. and A.H.A., will be brought by Harold Hillenbrand, D.D.S., American Dental Association secretary; Russell Nelson, M.D., chairman of the council on professional practice of the A.H.A., and Hugh H. Hussey, M.D., dean of the medical school, Georgetown University, and a trustee of the American Medical Association.

Some 22 speakers, panelists and discussion leaders will cover such topics as the responsibility for care of patients, approval programs for dentistry in hospitals, dental education programs in hospitals and departmental relations.

The conference results will be summarized at a luncheon on the third day by Edwin L. Crosby, M.D., director of the American Hospital Association.

DENTIST-POPULATION RATIO OF SOUTH IMPROVED IN 1956

Southern regions of the country improved their dentist-population ratios in 1956, according to figures released by the Bureau of Economic Research and Statistics in mid-May. The improvement in the South took place at the same time that the nation-wide dentist-population ratio worsened somewhat.

The national ratio was one dentist to 1,671 of population, as compared to one

to 1,667 the year before. The Southeast had one dentist to 2,990 persons; in 1955 it was one to 3,076. The Southwest registered a ratio of one to 2,944. The year before it was one to 2,962. The improvement of these two regions, which still have the least favorable ratios in the nation, continues a trend of recent years.

Within these two regions, seven states had dentist-population ratios of more than 1:3,000 in 1955. All of these improved in 1956.

The East and Far West continued to have the best ratios: Middle East, 1:1,402; New England, 1:1,497, and the Far West, 1:1,504. Nation-wide, there were 99,227 dentists; about 89,000 are estimated to be active professionally.

REVISE PAMPHLETS AND CHART IN TOOTHBRUSHING SERIES

Three pieces of dental health literature comprising the toothbrushing series have been revised by the Bureau of Dental Health Education. The modern format and new illustrations are designed to increase the usefulness of the literature for the dentist and patient.

The new edition of the *Toothbrushing Chart,* 21 by 25 inches, shows by means of eight large photographs the various procedures in toothbrushing. The chart is suitable for display in dental offices and schools. It is priced at 65 cents a copy.

Home Care of the Mouth, a leaflet designed to be placed in the patient's bathroom, illustrates proper toothbrushing through photographs and explains the procedures in simple language. It is priced as follows: 25 copies, 35 cents; 50 copies, 75 cents, and 100 copies, $1.25.

Toothbrushing, a two-fold leaflet, explains in six panels why, when and how to brush teeth. Photographs of an actual mouth clearly demonstrate the proper position of the brush as each surface of the tooth is cleaned. The leaflet also explains the role of dentifrices and mouth washes in oral hygiene. *Toothbrushing* sells at the following prices: 25 copies, 45 cents; 50 copies, 95 cents; 100 copies, $1.55. Sample copies of the two leaflets

Dentists from 31 states and Puerto Rico, representing 29 dental societies, 18 health departments and the U. S. Public Health Service, took part in the Eighth National Dental Health Conference April 22-24 in the Association's Central Office. The conference was sponsored by the Council on Dental Health. The conferees divided into three groups, each to study a different aspect of state-level programs. Chairmen and recorders for the groups were (l. to r.): David B. Ast of Albany, N. Y.; Gus Pinkerton of Tyler, Texas; Mrs. Phyllis Hart Davis of Los Angeles; Kenneth A. Easlick of Ann Arbor, Mich.; C. Edward Rutledge of Richmond, Calif., and David F. Striffler of Santa Fe, N. Mex.

are available from the Bureau of Dental Health Education. Orders may be placed with the Order Department at the Central Office.

RELIEF FUND AT $127,752 IN LAST WEEKS OF DRIVE

Contributions to the Golden Anniversary Relief Fund drive reached $127,752.41 on May 20. From mid-April to mid-May, $1,705 was received to bring the total to its new high. The current drive ends June 30.

Meanwhile, the Association's Relief Fund has been named one of ten residuary legatees in a will of William H. Havey, a dentist of Waltham, Mass. Dr. Havey, who died February 22, left his estate to his niece. The Association will share in the estate after her death.

FLUORIDATION OPPONENT LOSES SUIT AGAINST A.D.A.

The $200,000 libel suit against the American Dental Association filed by fluoridation opponent Robert J. H. Mick of Laurel Springs, N. J., was dismissed by the New Jersey Superior Court May 22.

Judge Edward Martino dismissed Dr. Mick's complaint "with prejudice," so that the suit cannot be reinstituted in New Jersey.

Dr. Mick had claimed that statements of Association officials and articles in its publications on fluoridation contained "false and libelous statements."

Named in the suit were the Association; Lon W. Morrey, editor, and Mr. Herbert Bain, director of the Bureau of Public Information. Anthony M. Lario of Camden was Association counsel.

STATE SOCIETY DUES AVERAGE $22 ANNUALLY, SURVEY FINDS

Dues for active members of constituent (state and territorial) dental societies of the American Dental Association average $22 a year, according to a new report compiled by Louis M. Cruttenden, Association assistant secretary. The $22 figure does not include the $20 annual dues of the A.D.A. nor those of the component organization.

Constituent society dues range from a high of $100 for Alaskan dentists to a low of $3 a year for dentists in the Panama Canal Zone. Among state societies, dues range from $45 a year for Delaware to $6 a year for Ohio. Of the 54 constituent societies, 30 have dues of $20 or more a year.

The survey also shows that seven societies charge dues to members in the Armed Forces; the rest do not. A dentist in his first year after graduation from dental school pays the same dues as other members in 20 societies and pays a reduced rate in 19. Fifteen societies charge no dues during this first year.

For those societies reporting life membership provisions, eligibility requirements are 25 to 40 years' membership in the state group and an age of from 60 to 70 years.

SUBSCRIPTS • Reprints of the article "What You Should Know About Fluoridation" which was published in the May 12 issue of *Parade* may be obtained from the Bureau of Public Information at the Central Office. Reprints of the article written by Harry Lyons, Association president, are $5 per thousand. . . . The Georgetown University Dental Alumni Association will meet November 5 at the Hotel Algiers in Miami Beach; Alpha Omega has changed its meeting place. It will meet at the Americana. . . . Mr. Denton L. Smith of the Research Division of the Council on Dental Research resigned June 30. Mr. Smith, who worked at the National Bureau of Standards, will become assistant director of research of the J. M. Ney Co. in Hartford, Conn.

Dental Societies

ILLINOIS SOCIETIES OPPOSE PUBLIC DENTURIST BILL

A "public denturist" bill which would authorize certain dental technicians to sell dental appliances directly to the public has been introduced into the Illinois legislature. It is similar to a measure which was defeated two years ago. The bill would create a class of licensed technicians known as "public denturists" who would need only a trade school education and apprenticeship to perform certain procedures directly on patients.

The bill is sponsored by some of the laboratories recently enjoined by the Cook County Superior Court from dealing with the public in a suit brought by the Chicago Dental Society. It is opposed by the Chicago Dental Society, the Illinois State Dental Society and the Illinois Dental Laboratory Association. Chicago daily papers have condemned the bill also. The *Sun-Times* termed it a "health menacing special-interest bill." The *Chicago Tribune* said, "It's a rotten bill, and fortunately one that should be easy to kill."

Although the bill has been reported out favorably by the legislature's committee on licensing and miscellany, it must clear the appropriations committee before reaching the floor of the legislature.

LABORATORY REGISTRATION PROPOSED IN FLORIDA BILL

A bill requiring the yearly registration of dental laboratories has passed the lower house of the Florida Legislature. If the measure becomes law, the laboratories will register with the Florida Board of Dental Examiners, which will have the right to inspect them to check compliance

Honored guests at a testimonial dinner for Harry Lyons, president of the American Dental Association, given by the Virginia State Dental Association April 29 included (l. to r.): Gerald D. Timmons, dean of the School of Dentistry, Temple University; W. T. McAfee, secretary-treasurer, Virginia State Dental Association; Dr. Lyons; William N. Hodgkin, toastmaster; J. Pilcher Bradshaw, president, Virginia State Dental Association, and Harold Hillenbrand, secretary, American Dental Association. Other guests, not shown, were: William T. Sanger, chancellor, Medical College of Virginia; Howard B. Higgins, Association Fifth District Trustee, and members of Dr. Lyons' family.

with provisions of the Florida Dental Practice Act.

Violations would be grounds for suspension of registration, fines up to $1,000 and imprisonment up to one year. Under the dental practice law, laboratories may not deal directly with the public.

The proposed registration act was sought by the state board of dental examiners.

STRENGTHEN NORTH CAROLINA DENTAL PRACTICE ACT

Amendments strengthening the North Carolina Dental Practice Act have been enacted by the state legislature. The new provisions define dental prosthetic service more precisely and forbid dental technicians from dealing directly with the public. They also empower the board of dental examiners to apply to the courts for an injunction to restrain illegal practice.

MONTANA DENTIST HONORED BY STATE MEDICAL SOCIETY

A Montana dentist, previously chosen as outstanding dentist in his state, has now been honored by his state's medical society.

O. A. Kenck of Augusta, Mont., was awarded honorary membership in the Montana Medical Association at the physicians' and surgeons' tenth annual meeting in March. He is the first dentist to be so honored.

The resolution bestowing membership on Dr. Kenck cited his more than 50 years of service to his community. Special attention was drawn to the aid he gave the ill in medical emergencies in the early days of his practice when Augusta did not have a physician and to his continuing devotion to his profession.

Dr. Kenck is a past president of the Montana State Dental Association and a life member of the American Dental Association.

Some 250 dentists attended a dinner sponsored by the Arkansas State Dental Association for William R. Alstadt (inset), president-elect of the American Dental Association. The dinner was held April 8 in Little Rock, Ark. Among guests were (l. to r.): Lloyd Brannon, president of the Arkansas State Dental Association, Mrs. Brannon; H. M. Flickinger, American Dental Association Twelfth District Trustee, and Mrs. Flickinger. Awards were made to Dr. Alstadt from the states in the Twelfth District. Congratulatory messages were received from many places in the United States and abroad.

Some 200 dentists and their wives attended the April 13 meeting of the Monongahela Valley Dental Society in Morgantown, W. Va. During the meeting, guests toured the research facilities of the School of Dentistry, West Virginia University. Talking with Dean J. Ben Robinson (left) are (l. to r.): Shailer Peterson, secretary, American Dental Association Council on Dental Education; Carl Laughlin, chairman, Council on Dental Education, and president-elect of the state dental society; Kenneth V. Randolph, newly-appointed associate dental dean; Charles Singleton, president of the state society, and Ed Armbrecht, society vice-president.

HARRY GEURINK DIES; WAS OHIO SOCIETY OFFICIAL

Harry J. Geurink, vice-president of the Ohio State Dental Association, died of a heart condition April 27. He was 56 years old.

Dr. Geurink was born in Cleveland March 28, 1901. He was graduated from Western Reserve University School of Dentistry in 1925. Active in organized dentistry during the past ten years, he served as president of the Cleveland Dental Society in 1947, as chairman of the state society's commercial exhibits the same year and as a delegate from the state organization to the American Dental Association House of Delegates continuously from 1947. No action will be taken to fill Dr. Geurink's place as state society vice-president until the fall.

Dental Education

HONOR FOUR AT TEMPLE ANNIVERSARY CELEBRATION

Honorary doctor of science degrees were awarded four distinguished members of the dental profession May 1 at ceremonies marking the fiftieth anniversary of the affiliation of the School of Dentistry with Temple University. The school formerly Philadelphia Dental College, became part of Temple in 1907. A day-long program on the campus in Philadelphia was climaxed with a dinner honoring Dean Gerald D. Timmons for his 15 years of service. "Golden Circle" awards were presented to the 26 living alumni of the class of 1907.

The four receiving the honorary degrees were: Lester W. Burket, dean of the School of Dentistry of the University of Pennsylvania; Otto W. Brandhorst, secretary of the American College of Dentists; Leslie M. FitzGerald, secretary of the American Board of Oral Surgery, and Harry Lyons, dean of the School of

Four honorary doctor of science degrees were awarded May 1 in Philadelphia at alumni day exercises celebrating the fiftieth anniversary of the affiliation of the School of Dentistry with Temple University. Those honored for distinguished service in dentistry were (l. to r.): Lester W. Burket, dean of the School of Dentistry of the University of Pennsylvania; Otto W. Brandhorst, secretary of the American College of Dentists; Leslie M. FitzGerald, secretary of the American Board of Oral Surgery, and Harry Lyons, dean of the School of Dentistry, Medical College of Virginia, and president of the American Dental Association. At far right is Dean Timmons.

Dentistry, Medical College of Virginia, and president of the American Dental Association.

Dr. Lyons, in a keynote address, pointed to the advances made by dentistry during the last 50 years. "Dental education at Temple University during these 50 years," he said, "has contributed more than its equitable share to the advancement of dentistry."

Dr. Lyons urged the profession to meet the challenge of educating the public to the importance of dental health and urged it also to find ways of providing dental care for the population. Failure of the profession to meet this responsibility will result in dental health care plans which may be unacceptable to dentistry, he said. "The masses will not long be denied health care," the dental executive stated. "Either we provide it under our own professional control or else we forfeit our current professional privileges which we cherish as part of our heritage."

NEW ENGLAND MEDICAL AND DENTAL PLAN PROPOSED

The New England Board of Higher Education, representing the states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont, has proposed formation of a regional compact to provide increased facilities for medical and dental education in the New England states. Similar compacts have been established in two other parts of the country, the west and the south.

The New England plan will become effective on adoption by any one of the compacting states and by one of the existing schools. Approval by two states is expected shortly.

With ratification of such a compact, various forms of cooperation between the compacting states is made possible. One method is an arrangement whereby a compacting school agrees to accept out-of-state students in return

for which it receives from the states a per student payment to help underwrite the cost of their education.

NEW ASSISTANTS' TRAINING PROGRAM STARTS AT CAROLINA

An experimental education and training program for dental assistants will begin June 6 at the University of North Carolina School of Dentistry. The program, made possible by a grant from the U. S. Public Health Service, is designed to help evaluate the training of assistants in a dental school and the value of teaching dental students how to use the services of an assistant. Ten girls will be chosen for the study, and the school invites applications. The North Carolina school is one of five selected by the USPHS for pilot studies in the training of assistants.

As the program is set up, the ten girls will be enrolled for 12 weeks at the dental school for lectures, laboratory procedures, demonstrations and limited clinical work. After a comprehensive evaluation at the end of the 12 week period, five trainees will continue at the school, each working with a dental student in the clinics, and five will be employed by dental practitioners. After nine months, examinations will be given to both groups, and certificates issued. Salaries will be paid trainees during their stay at the school.

ILLINOIS DENTAL STUDENTS TO WORK WITH ASSISTANTS

Senior dental students will work with dental assistants in a new teaching program to start this fall at the University of Illinois College of Dentistry. The assistants will aid the students in the chairside operations that are part of the practicing dentist's routine.

The program is designed to study the value of teaching dental students to use the services of assistants as well as to determine the practicability of initiating a course of instruction in dental assisting at the school. The program has been arranged between the dental school and the division of dental resources of the U.S. Public Health Service. Five certified dental assistants will take part in the program.

WEST VIRGINIA SCHOOL NAMES K. V. RANDOLPH ASSISTANT DEAN

The appointment of Kenneth V. Randolph of Baltimore as associate dean of the West Virginia University School of Dentistry in Morgantown, W. Va., was announced in mid-April. Dr. Randolph currently is professor and head of the department of operative dentistry at the Dental School, University of Maryland, the school from which he received his dental degree. In addition to the D.D.S. degree, he holds a B.S. degree in education.

The new assistant dean has been a frequent lecturer at dental meetings.

K. V. Randolph

Dr. Randolph is a member of the Baltimore City Dental Society and the Maryland State Dental Association. He is a Fellow of the American College of Dentists. In his new post he will assist Dean J. Ben Robinson in the administration of the dental school, which will admit its first class in September.

HARVARD INAUGURATES THREE PART POSTDOCTORAL PROGRAM

A three part postdoctoral program will be inaugurated this September at Harvard School of Dental Medicine in Cambridge, Mass. Students accepted for the course will engage in research, teaching and clinical practice.

The program will be under the direction of Reidar F. Sognnaes, associate dean of the school, and will be carried on in collaboration with the basic science department of Harvard Medical School and affiliated clinics at the Forsyth Dental Infirmary for Children, Children's Hospital and Massachusetts General Hospital. A grant of $162,000 from the U. S. Public Health Service underwrites the program.

Three students will be admitted each year for three years.

AUGUST 21 AND 22 ARE DATES OF MISSISSIPPI CONFERENCE

William R. Alstadt, president-elect of the American Dental Association, will be a clinician at a two day conference in Mississippi on oral diagnosis, roentgenology and treatment planning. The August 21 and 22 meeting, on the campus of the University of Mississippi, is sponsored by the University's center for continuation study and the Mississippi Dental Association.

Other clinicians are: Lee Roy Main, dean of the School of Dentistry, St. Louis University; Beryl Ritchey of Colorado Springs, and Hamilton B. G. Robinson, associate dean of the College of Dentistry, Ohio State University.

SCHOOLS PUBLISH SCHEDULES OF SUMMER AND FALL COURSES

Emory • Eight postgraduate courses are offered by Emory University School of Dentistry in Atlanta, Ga., during the 1957-1958 school year. They are: periodontics, May 27-31; endodontics, September 17 and 18; improved technics in periodontics, October 28 and 29; minor tooth movement, December 4-6; occlusion, February 3-7, 1958; posterior crown and bridge prosthodontics, March 5-7, 1958; pedodontics, April 23-25, 1958; refresher course in immediate denture prosthesis, May 8, 1958, and periodontics, May 19-23.

Additionally, the school announces its seventh annual postgraduate alumni seminar June 6 and 7. Three courses are offered: endodontics, partial denture prosthodontics and esthetic anterior restorations.

Minnesota • The twelfth annual seminar for the study and practice of oral medicine, sponsored by the University of Minnesota School of Dentistry, will be held in Minneapolis September 27 and 28. The seminar is cosponsored by the University's center for continuation study. Details on the two day program may be obtained from the center for continuation study.

Northwestern • An advanced course in cephalometric roentgenology has been announced by Northwestern University Dental School in Chicago. To be given June 10-12, the course is designed for the practicing orthodontist. A previous course in cephalometric roentgenology or equivalent training is a prerequisite.

Temple • Temple University School of Dentistry in Philadelphia lists 13 courses for the 1957-1958 session. Courses run from October through June. Included are clinical endodontics, oral roentgenology, rehabilitation of the edentulous patient, practical uses of electrosurgery in dentistry and advanced surgical technics in periodontal therapy.

400 ATTEND TENNESSEE DENTAL WRITING PROGRAM

Some 400 dental students attended a program on dental writing presented at the University of Tennessee College of Dentistry May 27. The program was arranged for the student chapter of the American Dental Association by the Tennessee State Dental Association. Floyd D. Ostrander, editor of the Michigan State Dental Association, and George B. Denton, research consultant to the Bureau of Library and Indexing Service, lectured on dental writing and research, dental editorial work and malapropisms.

Public Health

NATIONAL HEALTH SURVEY INTERVIEWS START IN MAY

The National Health Survey authorized by Congress last year got under way nationwide in May. A project of the U. S. Public Health Service, the survey will provide comprehensive statistics on the amount of illness in the general population, on medical and dental care received, on disabilities and related health information. It is the first time in 20 years that an effort has been made to collect these facts on a comprehensive basis. The Census Bureau is doing the household interviews for the USPHS.

Each month 3,000 households will be interviewed. Statistics will be compiled for the country as a whole and for each of 11 geographical regions. Data from these regions will be broken down to provide information on large metropolitan areas as a group, all other urban areas as a group and rural areas. Additionally, figures will be compiled separately for the eight largest metropolitan areas.

The survey will be on a continuing basis, and information will be provided periodically.

In addition to the household interviews, the USPHS will conduct two special studies, one of which is designed to improve technics by which information is obtained and illness measured.

THREE GROUPS STUDY DENTAL CARE FOR CHRONICALLY ILL

A study to develop portable dental equipment and technics useful for the dental care of bedfast patients has been undertaken by the division of dental public health of the U.S. Public Health Service. Cooperating institutions are Montefiore Hospital and Beth Abraham Nursing Home of New York. Additionally, information will be obtained on the cost and administrative problems of providing care and the effect of care on rehabilitation.

In launching the study, Norman F. Gerrie, chief of the USPHS dental public health division, pointed out that more than five million Americans suffer from chronic illness or the debilities of old age. The group continues to grow because of longer life spans and increasing population, yet little information exists on the extent and nature of their dental ailments and needs.

The patients in Montefiore Hospital's home care program and those of the Beth Abraham Nursing Home are considered representative of patients found in many institutions and among the homebound chronically ill population. Results of the study, therefore, should be applicable to other groups.

A Public Health Service dentist and dental hygienist will accumulate the data. Complete dental service will be provided to nearly 500 patients in the two institutions. A three-chair clinic has been set up at Beth Abraham, and provision has been made for the treatment of stretcher and bedfast patients.

NEVADA STUDIES DENTAL NEED OF LONG-TERM PATIENT

A pilot study to determine the dental needs of the chronically ill, hospitalized patient is being conducted at the Nevada State Hospital through the cooperation of the Division of Dental Public Health of the U. S. Public Health Service and the Dental Division of the Nevada State Department of Health.

Purpose of the study, according to O. M. Seifert of Reno, state dental director, is to "determine the optimum professional and auxiliary personnel ratio to hospitalized patients, the time and cost

needs for meeting the backlog of dental requirements, as well as dental services required on a maintenance basis, and to develop specialized equipment and technics for this particular kind of hospital population."

The study is expected to provide information useful to other similar institutions.

SHEBOYGAN COMPLETES TEN YEARS OF FLUORIDATION

A reduction of about 50 per cent in dental caries in the teeth of school children was reported May 1 with the completion of a ten year study of fluoridation in Sheboygan, Wis. The study showed that the average kindergarten child had a caries rate of 4.8 in 1945, the year before fluoridation began. In 1956, the same age group had a dmf rate of 1.96. In older children, the improvement also was dramatic.

At the same time that the results of the Sheboygan study were announced, the U.S. Public Health Service reported that 1,506 communities with a population of 31,566,653 drank fluoridated water.

In Raleigh, N.C., voters approved the health measure in the second referendum in five months.

Meanwhile, Leona Baumgartner, M.D., New York city health commissioner, issued the report of the city's bureau of dentistry. A third of New York's school children do not get the dental care they need, Dr. Baumgartner stated. In poorer neighborhoods, the figure runs as high as two thirds. "The most widespread health problem among New York City school children is tooth decay," she asserted. "Reducing tooth decay by water fluoridation offers the one realistic approach to changing this picture of dental neglect." Public hearings were held March 6 by New York City's Board of Estimate, but to date no further action has been taken.

Research

UNDERGRADUATE RESEARCHERS APPROVED AT 16 SCHOOLS

The U. S. Public Health Service will support undergraduate researchers at 16 dental schools in its new postsophomore research traineeship program. Two trainees will receive stipends at each of 12 of the dental schools; at four schools, there will be one candidate apiece. In addition to the dental schools, 63 medical schools and one school of osteopathy will participate.

The USPHS National Institutes of Health will finance the program, under which students interested in being trained for research who have completed two years of professional training will take a year out from their regular program to do research. At the end of the year, they will return for the second half of the regular professional program. Stipends run up to $3,200, plus allowances for dependents.

CONFER IADR SOUDER AWARD ON W. S. CROWELL

The International Association for Dental Research conferred its 1957 Wilmer Souder Award on W. S. Crowell of Philadelphia March 23. Mr. Crowell, chairman of the specifications committee of the IADR's dental materials group, is supervising chemical engineer of the S. S. White Dental Manufacturing Co. of Philadelphia. The award, highest honor in the field of dental materials research, is given to those scientists who bring about outstanding advances in health through materials research.

W. S. Crowell

Mr. Crowell is most prominently known for his publications on dental cements and amalgams. He is the third person to win the Souder Award.

The award was established by the dental materials group in honor of Wilmer Souder and his accomplishments in dental materials research.

SUBSCRIPTS • Among the 235 grants recently announced by the National Science Foundation for basic research in the sciences was one to Theodor Rosebury of the Washington University School of Dentistry in St. Louis. The grant, for $10,000, will support a study on the interaction of microorganisms indigenous to man. . . . A substance extracted from oat hulls is reported by two scientists to give protection against tooth decay. The report, by Funito Taketa and P. H. Phillips of the University of Wisconsin, was given in April to the Federation of American Societies for Experimental Biology. Experiments with the oat-hull substance were carried out on rats. . . . Recent visitors to the American Dental Association's research activities at the National Bureau of Standards include Yngve Hildebrand of Sweden, Prof. John Osborne of England and Takao Fusayama of Japan. . . . Mail for the International Association for Dental Research should now be addressed to secretary-treasurer Dan Y. Burrill, at 311 E. Chicago Ave., Chicago 11.

International

ERICH MÜLLER HEADS GERMAN DENTAL ASSOCIATION

Erich Müller was installed as president of the German Dental Association by its house of delegates March 30. Karl Waffenschmidt is vice-president. Members of the board of trustees are: Albert Beilert, Wilhelm Euler, Bernhard Fechter, Gerhard Leutke, Karl Pfeiffer, Bernard Warneke and Karl Winter.

TAX AID ON PENSION PLANS WON BY CANADIAN DENTISTS

Canadian dentists and other self-employed persons can now defer tax payments on funds put into retirement plans. On March 14, the Canadian House of Commons approved an amendment to the income tax act which allows deduction from taxable income of annuity payments up to 10 per cent of yearly earnings, the deduction not to exceed $2,500. Taxes will be paid at the time the pension is received.

The Canadian Dental Association and several other national groups have sought such an amendment for a number of years. The American Dental Association is pressing the U. S. Congress for a similar measure.

Under the Canadian tax amendment, the taxpayer files with his income tax return a receipt for the amount paid for the purchase of his annuity.

To be eligible for deduction, the annuity must be payable in equal annual amounts for the full life of the policy holder after his retirement. It may provide for payments to his beneficiaries after his death. The policy holder must retire by age 70.

When the self-employed person is also a member of an employer-employee plan, his total deduction may not exceed $1,500.

All plans for which deductions are

claimed must be approved by the Minister of Finance. Deductions begin with 1957 income.

DEFENSE DEPARTMENT TO SEND THOMAS FOX TO FDI CONGRESS

Thomas P. Fox of Philadelphia, chairman of the Department of Defense dental advisory committee, will represent the Department at the Fédération Dentaire Internationale Twelfth International Dental Congress September 7-14 in Rome.

The Armed Forces will be represented by Maj. Gen. James M. Epperly, DC (USA), chief of the Army Dental Corps; Rear Admiral Ralph W. Malone, DC (USN), chief of the dental division, Bureau of Medicine and Surgery, Department of the Navy, and Brig. Gen. James S. Cathroe, DC (USAF), deputy assistant for dental services, Office of the Surgeon General, Department of the Air Force.

FALL MEETING TO BE CENTRAL AMERICAN SOCIETY'S FIRST

The first meeting of the Federación Odontológica de Centro América y Panamá will be held in Guatemala September 11-14. At that time, the organization will be barely one year old. Formed last Sep-

The Twelfth International Dental Congress of the Fédération Dentaire Internationale will be held in Rome September 7-14. Participants will be able to attend scientific sessions reporting the latest developments in world-wide dentistry. Of interest also are such buildings as the monument to former King Victor Emmanuel II (foreground) and the Colosseum at the far end of the Via dei Fori Imperiali. The Colosseum, built around 80 A.D., was the site of ancient Rome's gladiator fights. (Photo courtesy of the Italian State Tourist Office.)

tember by seven dental groups in Costa Rica, El Salvador, Guatemala, Honduras and Panama, the Federación plans to meet each year in a different country of Central America. It hopes to raise the standard of dentistry in that area.

The meeting will be held in the old building of the University of San Carlos Borromeo, one of the oldest in the continent. United States dentists interested in attending the Guatemalan meeting are asked to contact Harold Hillenbrand, American Dental Association secretary, at the Central Office, 222 E. Superior St., in Chicago.

U. S. DENTISTS INVITED TO ARGENTINE OCTOBER MEETING

Dentists from the United States are invited to take part in the October 14-17 meeting of the Asociacion Odontologica Argentina in Buenos Aires. The Asociacion's Thirteenth Jornadas, as the meeting is called, will have participants from a number of countries. Table clinics, demonstrations on patients and round table discussions are planned, as well as visits to commercial and industrial firms in Buenos Aires. Those interested in the meeting are asked to contact Antonio Calle Guevara, Asociacion president, before June 30. Letters to Dr. Guevara may be sent to him at the Asociacion Odontologica Argentina, 959 Junin, Buenos Aires, Argentina.

FERNANDO MORBAN ELECTED HEAD OF DOMINICAN DENTISTS

Fernando Morban L. has been elected president of the Sociedad Odontológica Dominicana. The Dominican Dental Society's headquarters are in Ciudad Trujillo.

Accompanying Dr. Morban into office are: José Pezzotti, vice-president; Gilberto Sanoja, treasurer; Nildo C. de León, recording secretary, and Rafael Rodríguez L., corresponding secretary. Others chosen were Ralph Schimensky, René A. Puig Bentz and Aquiles Ant. Azar G., board members.

National Defense

TWO DENTISTS WANTED FOR NAVY OPERATION DEEP FREEZE

Two dental officer billets are available in the rank of lieutenant commander or below for Operation Deep Freeze III in Antarctica and the climax of the International Geophysical Year. Scientists from more than 50 nations are participating in the scientific event.

The dental officers selected for the Navy billets will serve as Navy dental officers in Rhode Island until about November of this year. At that time they will depart for Antarctica for an 18 month stay. Further information on these billets may be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C.

GENERAL RENFROW RESIGNS FROM SELECTIVE SERVICE

Brig. Gen. Louis H. Renfrow, civilian deputy director of Selective Service, resigned May 1, after 15 years as deputy director. Three months previous, he had been retired from the Army on reaching the statutory retirement age. He had spent almost 40 years in military service. General Renfrow was the first dental officer to be assistant military aide to the President, the first dental reserve officer of the Army to be promoted to the grade of brigadier general and the first dental officer to be deputy director of Selective Service.

General

WASHINGTON TO BE SITE OF NATIONAL MEDICAL LIBRARY

The National Library of Medicine, which is being created out of the collection of the Armed Forces Medical Library, will be located in the Greater Washington, D. C., area, on the grounds of the National Institutes of Health in Bethesda, Md. The decision to construct the new building at Bethesda was made by the library's board of regents in late April. Chicago had been suggested as a possible site.

The board of regents is composed of 17 persons from the health professions, civic affairs and library administration. Dentist representative is Basil G. Bibby, director of the Eastman Dental Dispensary in Rochester, N. Y. Funds must now be obtained from Congress to begin construction.

PACIFIC COAST ASSISTANTS TO TOUR NAVY FACILITY

A tour of the Navy dental department in San Diego is part of the dental assistants' program at the Pacific Coast Conference in San Diego August 18-20. Other activities include a panel discussion, clinics and social events. Featured lecturers are Henry Tanner of Beverly Hills, Calif., and Ross Huntley of North Hollywood.

PREPAY DENTAL PLAN ELECTS PERCY PHILLIPS A DIRECTOR

Percy T. Phillips of New York, Second District Trustee of the American Dental Association, was named to the board of directors of Group Health Dental Insurance, Inc., April 24. Dr. Phillips has been chairman of G.H.D.I.'s dental advisory council since the prepayment plan was started in 1954. Elected with Dr. Phillips was David M. Delo, geologist and author and president of Wagner College, Staten Island. The board of directors consists of 24 members, equally divided between dentists and laymen. G.H.D.I. has been approved by the First District Dental Society of New York.

EDWARD R. ASTON CITED BY INDUSTRIAL DENTISTS

Edward R. Aston of Camp Hill, Pa., industrial dental consultant to the Pennsylvania State Department of Health, has been cited for his "pioneering work in the field of industrial dentistry." The American Association of Industrial Dentists at its April 22-24 meeting in St. Louis presented him with its first special award, a gold plaque.

Dr. Aston has become widely known for developing the Pennsylvania industrial dental program, believed to be the first such program in the nation. Additionally, he is the only dentist ever to have been named an associate editor of *Industrial Medicine and Surgery*, the international journal in this field.

MUSEUM SPONSORS VISUAL EDUCATION SCHOLARSHIP

A $500 scholarship, available to a graduate student interested in school health education, visual methods in education or educational work in museums, has been announced by the Cleveland Health Museum.

The student will work on special projects at the museum under the direction of the professional staff. The projects will take one to three months to complete. Applications may be addressed to Bruno Gebhard, M.D., director, Cleveland Health Museum, 8911 Euclid Ave., Cleveland 6.

TOOTHBRUSH COMPANIES VOTE HEALTH EDUCATION PROJECT

Toothbrush manufacturers at the recent convention of the American Brush Manufacturers Association in White Sulphur Springs, W. Va., voted to underwrite a dental health education project designed to improve oral health through the proper use of toothbrushes.

The project, which probably will be keyed to National Children's Dental Health Week, is being developed in cooperation with the American Dental Association's Bureau of Dental Health Education. Manufacturers pledged $5,000 to finance the initial phase of the program.

TWO FACE TRIAL IN ALLEGED FRAUD OF DENTISTS

A Brooklyn federal grand jury April 26 indicted a Long Island, N. Y., couple on six counts of mail fraud. They were charged with having illegally obtained $11,000 from 200 dentists across the country.

The indictments named Henry K. Comens and his wife Etta, operators of the Empire Dental Supply Co. and the Best Buy Dental Supply Co. The firms offered dental equipment at "the lowest price in the country," a method of business which forced them last December to file bankruptcy statements. The couple continued to solicit and accept orders after they realized the firms were bankrupt. Checks were accepted even when orders could not be filled. If convicted, they face five year prison terms, $10,000 fines, or both.

FIRST CIVILIAN DENTIST OPENS PRACTICE ON OKINAWA

J. Ross Garman of Erie, Pa., will be the first civilian dentist from the United States to practice dentistry on Okinawa. Dr. Garman, a 1941 graduate of the University of Pittsburgh School of Dentistry, on completion of his military service, applied for and received a license from the Government of the Ryukyu Islands to practice on Okinawa. He leaves for the Pacific island in about a month. Including Dr. Garman, there will be four dentists on Okinawa; two from the Phillipines and one from Japan. Okinawa has a nonmilitary population of 574,579.

NAME A. B. COXWELL SECRETARY OF ORAL SURGEONS' SOCIETY

The American Society of Oral Surgeons has appointed A. B. Coxwell of Louisville, Ky., executive secretary to succeed Miss Ruth Whalen. Miss Whalen, whose resignation becomes effective in November, has been named registrar of the School of Dentistry of the Medical College of Virginia.

Dr. Coxwell is a graduate of the University of Louisville School of Dentistry. He has been secretary-treasurer of the Kentucky State Dental Association for nine years. Executive offices of the American Society of Oral Surgeons are now at 2208 Dundee Rd., Louisville.

REHABILITATION CENTER OFFERS PROSTHETICS COURSE

Dentists interested in learning the technics of facial and surgical prosthetics are invited to a two-week concentrated course offered August 12-24 by the Sterling-Rock Falls Prosthetic and Rehabilitation Center in Rock Falls, Ill.

The center is a research and treatment foundation for the care of handicapped persons and for the education of dentists in prosthetic restoration.

The course will cover the prosthetic restoration of ears, noses and parts of the face. Flexible and hard prostheses, surgical implants and intraoral appliances will be discussed. The course will be taught with movies, lectures and demonstrations.

Guest instructors, prominent in their respective fields, will augment the staff of the center.

ROTATING INTERNSHIPS OFFERED BY TWO HOSPITALS

One year rotating dental internships are offered by Providence Hospital in Washington, D. C., and by the Veterans Administration Hospital in Los Angeles.

The VA hospital provides a yearly stipend of $2,130. The internship starts July 1. Application blanks may be obtained from E. B. Rousseau, chief of the dental service at the hospital.

At Providence Hospital, a yearly stipend of $3,600 will be paid as well as one week's vacation and five days' holiday time during the Christmas or New Year's period. Applicants may write the resident-intern committee at the hospital, 1150 Varnum St., N.E., Washington 17, D. C.

CHANGE REQUIREMENTS FOR PERIODONTOLOGY EXAMINATION

The American Board of Periodontology announces a change in its requirements for certification. After January 1, 1962, candidates will be examined only if they have had two academic years of formal graduate education at an approved institution.

At present, one year of such education and one additional year of formal training in the field or its equivalent are required. The three years of practice devoted primarily to periodontics, required at present, will be continued. Application for examination must be made before July 1 of the year preceding that in which the examinations are to be taken.

GOLD FOIL OPERATORS TO MEET IN NEW ORLEANS IN NOVEMBER

The American Academy of Gold Foil Operators, whose November 1 and 2 meeting was originally scheduled for Miami, Fla., will meet instead in New Orleans on those dates. The unavailability of clinic facilities needed for the program required the change. Arrangements have been made with the School of Dentistry, Loyola University, in New Orleans, to hold the workshop at the school. Headquarters for the meeting will be the Roosevelt Hotel.

Also • The town of Yass, Australia, recently marked the first anniversary of fluoridation of its water supply. Yass last year became the first town on the Australian mainland to adopt the health procedure. . . . Advisers to the United States delegation to the World Health Assembly held in Geneva in May included Lester W. Burket, dean of the School of Dentistry, University of Pennsylvania. . . . The dental alumni society of Pennsylvania's dental school held its annual reunion April 24 on the school's campus. More than 450 alumni attended. Oldest in the group was Joseph L. Snyder, 91, class of 1890. . . . National interest in health is reflected in the increasing number of health bills introduced into Congress. Many never get past committees, but the volume increases. In 1951-52, 250 measures were introduced, 407 were introduced in 1953-54 and 571 in 1955-56. . . . Army dental surgeons from stations all over the world attended their annual conference April 24-26 in the office of the Surgeon General of the Army in Washington, D.C. A demonstration of television in teaching was a feature of the program. . . .In Pennsylvania, a new sales tax exempts dental materials from the tax. Exemption was sought by the State society.

Cases and Comments

ESTABLISHING PLANE OF OCCLUSION IN COMPLETE DENTURE CONSTRUCTION

By Stanley G. Standard, D.D.S., New York.

One of the fundamental requirements in complete denture construction is the proper positioning of the plane of occlusion in relation to the structures in the oral cavity such as the tongue, lips and cheeks. To obtain this position, it is necessary to construct a pattern to be followed in the placement of the teeth. This is done by means of wax planes mounted on stabilized baseplates. A practical and efficient method of constructing this pattern has been devised.

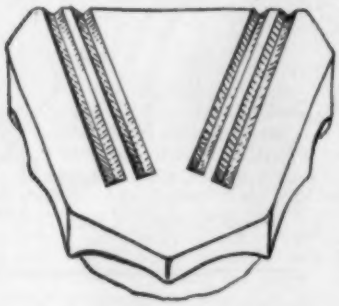


Fig. 1 • On the back of the cast is carved a remount index. This is done to permit replacement of the processed dentures on the articulator in the original position, in order to remove occlusal disharmonies created in processing. Metal remount plates can be used, but a simple geometric pattern carved into the cast is easier and equally as efficient.

Fig. 2 • The cast is surveyed to determine the center of the denture-bearing region, and marks are placed on the labial border of the cast to indicate this center.

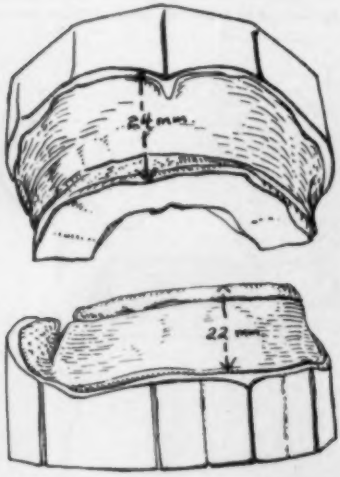


Fig. 3 • Well-fitting stabilized baseplates are constructed, and wax rims are attached. These rims should be approximately the width of a molar tooth. The upper rim is made 24 mm. in height from the peripheral border to the occlusal surface, and the anterior portion is built out at an angle of 20 degrees from the periphery. The lower rim is built 22 mm. in height. The occlusal surface is centered over the ridge as indicated by the survey marks. Wax rims of this size will more than accommodate any ridge relationship. It is necessary only to carve the wax into its final relationship. Additional wax need not be added.

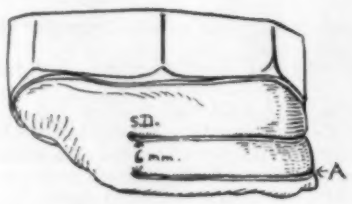


Fig. 4 • The upper bite-rim is placed in the mouth. The desired length of the central incisors (A) is marked on the wax plane. Then Stensen's duct (S.D.) is marked on the wax with a hook explorer. At a point 6 mm. downward toward the occlusal surface a line is carved to the anterior mark on both sides of the wax planes. With the use of a hot plate, the wax is melted down to this line. This procedure immediately establishes an approximate plane of occlusion.

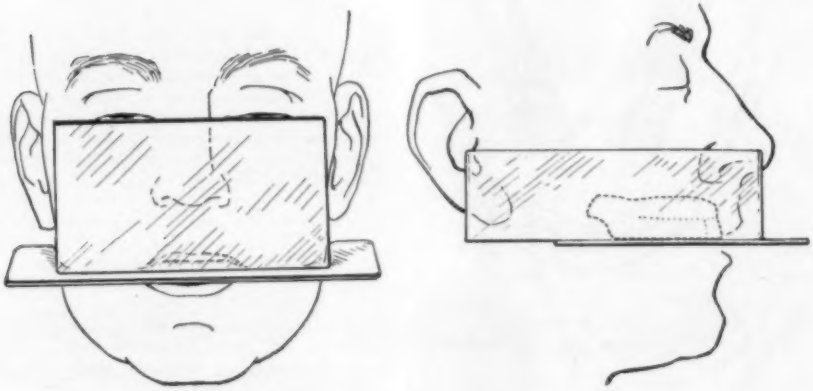


Fig. 5 • By use of a fox plane, the wax rims are further modified until the plane is parallel anteroposteriorly with the ala-tragus line and horizontally with the pupils of the eyes. The use of a plastic block placed on the fox plane against the face is of material assistance in determining this parallelism.

Fig. 6 • The anterior labial portion of the wax is planed down into a slight concavity, until the upper lip is held in a relaxed and pleasing position.

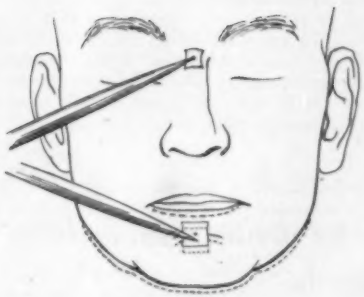
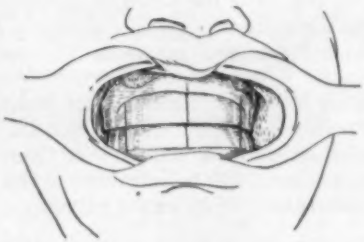


Fig. 7 • With the completed upper wax bite-rim in the mouth, the physiologic rest position is recorded. This is done by placing marks on adhesive tape on the bridge of the nose and on the lower third of the chin. The patient, who is in an upright position, is instructed to wet his lips, swallow and bring his jaws to a rest position. Calipers are used to measure the distance between the marks on the chin and the nose. This procedure is repeated not less than five times, until the measurement remains the same. This recording may then be accepted as physiologic rest. The amount of freeway space desired is selected. The amount should never be more than 3 mm. This distance is measured on the tape on the chin.

Fig. 8 • The lower wax bite-rim is reduced to a height represented by the length of the lower lip anteriorly and the tip of the retromolar pad. The surface of the lower wax plane is softened and petroleum jelly is placed on the upper plate. The patient bites into the softened lower wax rim until the preestablished occlusovertical dimension has been reached. The median line, the corners of the mouth and the high and low lip line are carved on the anterior portion of the wax rims. These measurements will assist in selecting the correct size teeth.



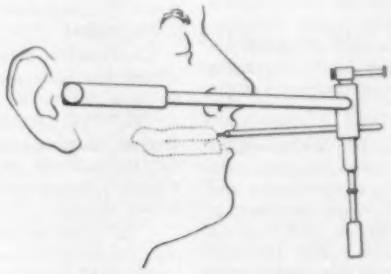


Fig. 9 • The face-bow fork is inserted above the high lip line of the upper bite-rim, and the face-bow transfer is recorded. This step is important in orienting the plane of occlusion correctly on the instrument.

225 West Thirty-fourth Street

BUREAU OF PUBLIC INFORMATION
JUDICIAL COUNCIL

Guiding principles for participation on radio and television programs

At the request of the Board of Trustees the Bureau of Public Information has prepared a statement of guiding principles for participation of the dental profession in radio and television programs. This statement has been reviewed by the Judicial Council.

At its March 1957 meeting, the Board of Trustees approved the recommendation of the Bureau and the Council that the statement be published in THE JOURNAL as a joint statement of the Judicial Council and the Bureau of Public Information. The statement will be submitted to the House of Delegates next November for its consideration. The statement follows:

The *Principles of Ethics* of the American Dental Association states:

"Section 20. Health Education of the Public • A dentist may properly participate in a program of health education of the public involving such media as the press, radio, television and lecture, provided that such programs are in keeping with the dignity of the profession and the custom of the dental profession of the community."

In view of the large number of requests for specific suggestions that could be used as a guide for the participation of constituent and component societies and their members in television and radio programs, the Judicial Council and the Bureau of Public Information of the American Dental Association have approved the following statement:

"Television and radio are desirable media for the health education of the public. Programs on either medium should be presented in keeping with the *Principles of Ethics* of the American Dental Association and the codes of the respective constituent and component dental societies.

"Rules for Dental Societies • The following is suggested as a guide for participation in telecasts and broadcasts by dental societies:

"1. Dental societies may sponsor, individually or with other ethical groups, open circuit telecasts and broadcasts which are of a public service nature provided the scripts, films, props and materials are approved in advance by authorized representatives of the dental society.

"2. Dental societies may participate in open circuit television and radio programs which do have commercial sponsors provided:

"a. That all scripts, films, props and advertising materials and statements in conjunction therewith be approved in advance by authorized representatives of the cooperating dental society;

"b. That the advertising, in general, be institutional in nature and that no endorsement by the dental society is made or implied for any commercial product, and

"c. That commercials during the program should not include the name of or reference to the dental society.

"3. In arranging for television and radio programs, the dental society should insist upon the right to determine the professional aspects of the programs in which it will participate and should clearly state in advance its right to terminate its participation in any program at any time it believes its participation is no longer in the best interests of the public.

"4. These same general principles shall apply to closed-circuit television with the exception that in programs devised solely for presentation to professional audiences, product advertising may be permitted in accord with the advertising and exhibit standards of the American Dental Association and of the respective constituent and component dental societies.

"Rules for Individual Dentists • The following is suggested as a guide for participation in telecasts and broadcasts by individual dentists:

"1. All invitations to individual dentists to participate on radio and television programs should be cleared in advance of acceptance with the authorized representative or committee of the dental society of which the dentist is a member.

"2. Insofar as possible, scripts, notes and other materials should be submitted to the designated representative of the society in advance for review and comment.

"3. A limitation should be established by each society on the maximum number of television or radio appearances to be made in any one year by a member of the dental society.

"4. The name and official dental society position or title of the member may be properly used on television and radio programs, but there should not be any reference to his address or his field of practice except for those not engaged in private practice. Descriptive terms such as 'expert,' 'specialist,' or 'authority' should be avoided.

"5. Every effort should be made to assure that the dentist's participation is a real contribution to the health education of the public. Detailed descriptions of technics and procedures, particularly those which are controversial, should be avoided."

The intent of the foregoing is to encourage rather than discourage the use of television and radio by dental societies for the health education of the public. Dental societies quite properly should take the lead in developing and encouraging television and radio programs in keeping with professional standards.

COUNCIL ON FEDERAL DENTAL SERVICES
COUNCIL ON SCIENTIFIC SESSION

Credit points for reserve dental officers

Reserve dental officers of the Armed Forces will have an opportunity to obtain three retirement credit points by attendance at the ninety-eighth annual scientific session of the American Dental Association in Miami, Nov. 4-7, 1957. Under a plan devised by the Councils on Federal Dental Service and Scientific Session, and the Dental Advisory Committee to the Department of Defense, reserve dental officers will be awarded credit points for attending certain approved portions of the scientific program.

In essence, the plan is as follows:

1. The Council on Scientific Session will accept suggestions from the Armed Forces for specific topics and essayists in the scientific program, just as it considers recommendations from other outside agencies.

2. After the scientific program has been adopted by the Council, copies will be sent to the Armed Forces so that they may specify which parts of the scientific session reservists will be required to attend in order to obtain point credit.

3. The military will assign men to register reservists at the individual required programs.

The plan, which has been approved by the Department of Defense, the Army, Navy and Air Force, will be tried for a three year period beginning with the Miami meeting.

BUREAU OF LIBRARY AND INDEXING SERVICE

Additions to the Library

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing these books. Most of these books may be purchased through the Bureau. Practically all the dental journals published in the world are available also to borrowers.

BOOKS

ADRIANI, JOHN. Techniques and procedures of anesthesia. 2d ed. Springfield, Ill., Thomas, 1956. 568 p. $8.75.

AILIANOS, J. C. Pedodontia-prolipsis; pedodontics-preventive dentistry. Athens, 1956. 46 p. Text in Greek, French and English.

AMERICAN DENTAL ASSOCIATION. Specifications for dental materials, prepared by George C. Paffenbarger and W. T. Sweeney for the Council on Dental Research, American Dental Association. 2d ed. Chicago, 1956. 104 p. $2.25.

AMERICAN DENTAL ASSOCIATION. BUREAU OF LIBRARY AND INDEXING SERVICE. Index to dental literature in the English language 1956. Chicago, 1957. 247 p. $10.

BACON, E. S. Your child's teeth; a guide for parents. New York, Dutton, 1957. 124 p. $2.50.

CASTAGNOLA, LUIGI. A system of endodontia; for the general practitioner. London, Pitman, 1956. 143 p. $9.

DARGENT, MARCEL & PAPILLON, JEAN. Le cancer du plancher de la bouche. Paris, Masson, 1955. 169 p. $6.

DENTAL BOARD OF THE UNITED KINGDOM. Minutes with reports of committees, etc. for the year 1955. London, 1956. 95 p. $1.

DENTAL CLINICS OF NORTH AMERICA, March 1957. Symposia on I. New developments in operative dentistry, II. Differential diagnosis of prosthodontic needs. Philadelphia, Saunders, 1957. 332 p.

DERKSEN, A. A. D. De ontwikkeling van de articulator vanaf zijn eerste verschijnigsvorm. (Reprinted from Tijdschrift voor Tandheelkunde, Vol. 63-64, 1956-57.) Utrecht, Tholen, 1957, 52 p.

FINCH, MATTHEW. Teething troubles. London, Dobson, 1956. 192 p. $2.25.

FONT LLORENS, JOSÉ. La odontología norteamericana. Valencia, 1956. 96 p.

HARNISCH, HERBERT. Sulfonamide und Antibiotica in der Zahn-, Mund- und Kieferheilkunde. 2d ed. Munich, Hanser, 1956. 109 p. DM12.60.

HEWITT, R. M. The physician-writer's book . . . tricks of the trade of medical writing. Philadelphia, Saunders, 1957. 415 p. $9.

HILTEBRANDT, CARL. Die Gestaltung der totalen Prothese. 2d ed. Heidelberg, Hüthig, 1956. 73 p. DM6.

KROGMAN, W. M. The physical growth of children: an appraisal of studies 1950-1955. (Society for Research in Child Development, Monographs, Vol. 20, No. 1.) Lafayette, Ind., Child Development Publications, 1956. 91 p. $2.50.

MCCALL, J. O. & WALD, S. S. Clinical dental roentgenology; technic and interpretation. 4th ed. Philadelphia, Saunders, 1957. 466 p. $10.

MCNEIL, D. R. The fight for fluoridation. New York, Oxford Univ. Press, 1957. 241 p. $5.

NATIONAL CANCER INSTITUTE. Cancer of the mouth and respiratory tract. Prepared by the National Cancer Institute in cooperation with the American Cancer Society. Washington, Govt. Print. Off., 1956. 20 p. $0.15.

NEEL, J. V. & SCHULL, W. J. The effect of exposure to the atomic bombs on pregnancy termination in Hiroshima and Nagasaki. Washington, National Research Council, 1956. 241 p. $2.25.

DAS NEUESTE AUS DER ZAHNHEILKUNDE; Zeitschriftenreferate aus den Jahren 1949-52. Mit einem Anhang: Arzneiverordnung für Zahnärzte. Vol. 1. Hannover, Schlütersche Verlagsanstalt und Buchdruckerei, 1952. 560 p.

NEW YORK. FIRST DISTRICT DENTAL SOCIETY. Professional education of dentists for tomorrow; papers presented before the First Dental Education Workshop. Vol. 1. Alfred J. Asgis, editor. New York, 1956. 112 p. Mimeo. Limited edition.

PERKINS, J. J. Principles and methods of sterilization. Springfield, Ill., Thomas, 1956. 340 p. $8.

RHEINWALD, ULRICH. Die Karies der Zähne als Korrosionserscheinung; eine ätiologische

Studie. Leipzig, Barth, 1956. 166 p. DM12.50.

SCHMIDT-PABST, EMIL. Die zahnärztliche Helferin. 2d ed. Hamburg, Fröhlich, 1956. 214 p. $1.75.

SLAVICK, FRED. Distribution of medical care costs and benefits under four collectively bargained insurance plans. (New York State School of Industrial and Labor Relations, Cornell University, Bulletin 37.) Ithaca, N. Y., 1956. 39 p. $0.35.

SOCIÉTÉ DES SCIENCES MÉDICALES DE LA RÉPUBLIQUE POPULAIRE ROUMAINE. SECTION DE STOMATOLOGIE. Conférence de stomatologie 17 au 19 Décembre 1956; résumé des raports. Bucharest, 1956. 35 p.

SOULET, HENRI. L'édenté molaire terminal et son traitement prothétique. Toulouse, Société Générale d'Impression, 1955. 83 p.

STOLL, F. A. Dental health education; for dental health educators in school and community health programs, with special considerations for the education of adults during dental treatment. Philadelphia, Lea & Febiger, 1957. 196 p. $4.50.

TRACY, J. E. The doctor as a witness. Philadelphia, Saunders, 1957. 225 p. $4.25.

U. S. CONGRESS. HOUSE. COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE. Medical school inquiry; staff report containing background information relating to schools of medicine, dentistry, osteopathy and public health. Washington, Govt. Print. Off., 1957. 479 p.

U. S. DEPT. OF COMMERCE. NATIONAL BUREAU OF STANDARDS. Regulation of radiation exposure by legislative means; recommendations of the National Committee on Radiation Protection. (National Bureau of Standards Handbook 61.) Washington, Govt. Print. Off., 1955. 60 p. $0.25.

WASHINGTON STATE DEPARTMENT OF HEALTH. DENTAL HEALTH SECTION. Dental survey findings in 21 Washington cities. Olympia, 1956. 24 p.

WEBSTER, W. W. Fractures of the facial bones. Lincoln, Univ. of Nebraska Press, 1957. 145 p. $6.50.

WEST VIRGINIA STATE DENTAL SOCIETY. Officers manual; guide to duties for officers, committees, council members. Charleston, 1954. 49 p. Mimeo.

THE YEARBOOK OF DENTISTRY 1956-57. Chicago, Year Book Publishers, 1957. 480 p. $6.

The American Dental Association Film Library

The kinescope reviewed in this article is a film record of a "live" television program on dentistry. It was presented March 3, 1957, on the ABC television network as a public service by Ciba Pharmaceutical Co., in cooperation with the American Dental Association and the American Medical Association and originated from the School of Dentistry, University of Texas, Houston. It is available for rental ($2.50) from the Film Library, Bureau of Library and Indexing Service, 222 E. Superior St., Chicago.

FILM REVIEW

Medical Horizons • Kinescope. 16 mm., black and white, sound, 26 minutes. Arrangements for loan can also be made with Ciba Pharmaceutical Co., Summit, N. J.

The purpose of this presentation is to help people save their teeth by promoting understanding of the importance of proper dental care. The child's early experience in the dental chair and the popular misconception about "baby teeth" are discussed with the mother of Rosemary, the patient. The dentist then explains to the child and her mother what a cavity is and how many cavities are revealed by Rosemary's roentgenograms. The child is asked to show the dentist how she brushes her teeth. After the brushing, a disclosing solution is applied to the teeth to show the areas where residues still remain.

This is followed by instructions and caution on the proper use of dental floss. The dentist tells the mother and daughter that sweets should not be taken between meals; if they are, however, the mouth should be rinsed immediately after eating. This is followed by a sequence on microorganisms. By means of microcinematography various kinds of motile bacteria inhabiting the oral cavity are shown. The toothbrush is emphasized as an effective

weapon in the removal of these bacteria. A demonstration of how bacteria attack the teeth is shown on a model. In the next sequence the dental hygienist is introduced. Her duties are explained and she is shown instructing the child in correct toothbrushing. The child then applies what she has learned.

This is followed by further discussion between the dentist and the child's mother regarding Rosemary's roentgenograms and the need for a space maintainer is explained. The loosening of teeth as the result of advanced periodontal disease is demonstrated on a model. Prevention of this condition is discussed. The dean of the dental school is asked by the commentator what part fluorides play in the prevention of tooth decay and whether dentistry is painless. He replies briefly to both questions and repeats the purpose of the program.

The program tends to overemphasize the association of bacteria with periodontal disease without sufficient attention to such causative factors as calculus and other mechanical irritants. It is suggested, therefore, that when this kinescope is shown by dental societies to community and civic groups, a dentist should be present to make prefatory remarks on other causative factors of dental disease. The use of models, drawings, film clips, demonstrations and patients increases the educational value of the presentation.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Denture Adherent Preparations

(See A.D.R. 1957, p. 121)

Kling (American Ferment Co., Inc.): Each 100 Gm. is stated to contain gum karaya, 99.509 Gm.; sodium borate, 0.25 Gm.; methyl salicylate, 0.174 Gm., and certified color, 0.067 Gm.

Corega Denture Adhesive Cream (Corega Chemical Company): Each 100 Gm. is stated to contain gum karaya, 45 Gm.; petrolatum, 46.16 Gm.; liquid petrolatum, 5.80 Gm.; magnesium oxide, heavy, 3 Gm.; propylparaben, 0.05 Gm.; and color, q.s.

Dichlorobenzalkonium Chloride*

Tetrasil Brand of Dichlorobenzalkonium Chloride Solution (Proco-Sol Chemical Company, Inc.) Each 100 ml. is stated to contain dichlorobenzalkonium chloride, 3.3 Gm.; fluorescein sodium, 0.015 Gm.; sodium nitrite, 3.1 Gm.; sodium carbonate, 0.8 Gm.; isopropyl alcohol, 31 ml.; propylene glycol, 7.7 ml.; distilled water, q.s. This is a concentrated dosage form intended for dilution with water, accord-

ing to directions for its use, to produce a 1:1,000 solution of dichlorobenzalkonium chloride.

*Dichlorobenzalkonium chloride is similar in chemical structure and in antibacterial properties to benzalkonium chloride and other quaternary ammonium compounds (See A.D.R. 1957, p. 87). The uses and limitations of chemical solutions for the disinfection of instruments are described in A.D.R. 1957, p. 82.

Tetracycline Hydrochloride, U.S.P. (See A.D.R. 1957, p. 70)

The following dosage forms for systemic use of brands of tetracycline hydrochloride, U.S.P. have been reclassified from Group B to Group A by the Council on Dental Therapeutics:

Achromycin Hydrochloride (Lederle Laboratories Division, American Cyanamid Co.) A brand of tetracycline hydrochloride.

Achromycin Hydrochloride Capsules, 50 mg., 100 mg., 250 mg.

Achromycin Hydrochloride Intravenous, in 100, 250 and 500 mg. vials.

Achromycin Hydrochloride Soluble Tablets, 50 mg.

Achromycin Hydrochloride Spersoids, 50 mg. per 3 Gm.

Achromycin Hydrochloride Tablets, 50 mg., 100 mg., 250 mg.

Achromycin for Oral Suspension, 50 mg./cc.

Achromycin Pediatric Drops, 100 mg./cc.

Tetracyn Hydrochloride (Pfizer Laboratories): A brand of tetracycline hydrochloride.

Tetracyn Hydrochloride Tablets 50 mg., 100 mg., 250 mg.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

The following additional products are classified in Group B:

Calcium Hydroxide Suspensions (See A.D.R. 1957, p. 137)

Hydroxyline (Calcium Hydroxide Cavity Lining Material) (George Taub Products): Stated to be a suspension of calcium hydroxide, 30.4 per cent, with methyl methacrylate polymers, 29.1 per cent, in methyl ethyl ketone.

This product is recognized as a cavity liner designed to protect the pulp from the irritant action of phosphoric acid in dental cements.

Zinc Bacitracin-Neomycin-Polymyxin B Troches (See report on p. 854)

Wybiotic Troches (Wyeth Laboratories): Each 3.7 Gm. troche is stated to contain zinc bacitracin, 300 units; neomycin sulfate, 5 mg. (base); polymyxin B sulfate, 2,000 units; citric acid, 50 mg.; cyclamate sodium, 8.333 mg.; color and flavor, in a candy base.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

Council classifies Wybiotic Troches in Group B

A mixture of zinc bacitracin, neomycin and polymyxin B in the form of Wybiotic Troches (Wyeth) has been classified in Group B (see p. 853).

Bacitracin U.S.P. is described in *Accepted Dental Remedies 1957*, p. 57. The zinc bacitracin employed in this product is a relatively insoluble salt with the same antibacterial characteristics as bacitracin. Zinc bacitracin is more stable in the dry state and lacks the bitterness of the base.

Neomycin Sulfate U.S.P.—"Neomycin sulfate is the sulfate of an antibacterial substance produced by the growth of *Streptomyces fradiae* Waksman. It contains an amount of neomycin sulfate equivalent to not less than 60 per cent of neomycin base, calculated on the dried basis."[1]

The purified compound is a white to yellowish material, practically odorless, occurring as crystals or powder. It is hygroscopic, and dissolves to the extent of about 1 Gm. in 1 ml. of water.

Neomycin sulfate is active against a wide variety of gram-positive and gram-negative bacteria as well as acid-fast bacteria, but is ineffective against fungi or viruses. Certain clostridia, neisseria, and strains of pneumococci, streptococci and *Escherichia coli* have been reported to be resistant *in vitro* to the drug.

Because of its reported toxicity when administered systemically in large doses, neomycin sulfate is employed largely by topical application to superficial infections.

Polymyxin B Sulfate U.S.P.—"Polymyxin B Sulfate is an antibacterial substance produced by the growth of *Bacillus polymyxa*. It has a potency of not less than 6,000 U.S.P. polymyxin B units per mg. calculated on the dried basis."[2]

Polymyxin B sulfate is a white to buff-colored powder. It is freely soluble in water, and slightly soluble in alcohol.

Polymyxin B sulfate is highly active against gram-negative bacteria including *E. coli, A. aerogenes* and *Pseudomonas aeruginosa*. When given parenterally, polymyxin B frequently produces neurotoxic and nephrotoxic effects. It is poorly absorbed from the intestinal tract and has been employed for the treatment of certain intestinal infections without producing toxic manifestations.

Pressman and Bender[3] have shown that the prior use of troches containing bacitracin, neomycin and polymyxin, particularly as an adjunct to parenterally administered penicillin, aids in the prevention of bacteremia after dental extraction procedures. Kutscher and associates[4-6] have found significantly fewer side-reactions after the topical oral use of these polypeptide antibiotic preparations than with penicillin or the tetracycline group of drugs.

The Council recently has discouraged the use of topical forms of penicillin because of their tendency to sensitize the individual against penicillin.[7] Bacitracin-neomycin-polymyxin B troches may have usefulness as a substitute for penicillin troches for local application. Since it is not likely that the ingredients of the mixture will be used extensively for systemic administration, the possibility of sensitizing the patient toward any of the polypeptide antibiotics would not appear to constitute a significant clinical hazard.

1. Pharmacopeia of the United States XV, p. 452.
2. Pharmacopeia of the United States XV, p. 564.
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COUNCIL ON DENTAL RESEARCH

Supplement to the list of certified dental materials

ADDITION • Since publication of the most recent List of Certified Dental Materials, Revised to December 1, 1956 (J.A.D.A. 54:130 Jan. 1957), the following material which conforms to American Dental Association Specification No. 12 for Denture Base Resins has been added.

CERTIFIED DENTURE BASE RESINS
(A.D.A. SPECIFICATION NO. 12, SECOND REVISION)
TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Tilon	Pink; plastic cake	Ticonium Division, Consolidated Metal Products Corporation

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

A correction

The following table was inadvertently omitted from the Bureau's report, "The 1956 Survey of Dental Practice. VII. Number of Patients and Patient Visits," which appeared in the May 1957 issue of THE JOURNAL of the American Dental Association.

Table 51 • Average number of patients of independent dentists in 1955, according to description of practice

Description of practice	Mean no. of patients	Median no. of patients
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	1,344	1,004
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked.	1,251	935
There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care.	1,029	765
You did not have as many patients as you would have liked.	611	398
All independent dentists	1,056	796

The 1956 survey of dental practice
VIII. Dentist busyness

The questionnaire included two questions designed to determine how busy dentists were and their ability to meet the existing demand for dental care. The responses to these questions are of particular interest in view of the fact that the dentist-population ratio has been decreasing. This survey has shown that dentists have been able to increase their patient load, largely by the employment of additional auxiliary personnel. It is important to know whether this increase has been sufficient to keep pace with increased demand for dental care.

Survey respondents were asked, "During 1955, approximately how long did your average patient have to wait for an initial appointment of a series (excluding emergency cases)?" Replies were not given in exact number of days, but alternative responses, as shown in Table 52, were checked.

More dentists checked "one week" than any other length of time (Table 52). One week was also the median length of wait for an appointment. The mean, however, was 12.8 days; it was considerably higher than the median because of the fact that a small proportion of the respondents reported unusually long average waits. (In computing the mean, one week was considered exactly seven days, two weeks 14 days and so forth. "Six weeks or more" was considered to be 45 days.)

In a second question relating to busyness, dentists were asked to check one of four given replies to the question: "If you were an independent dentist during 1955, which of the following statements comes closest to describing your practice *for the year as a whole?*" The four alternatives, as shown in Table 53, were effective in discriminating among dentists with respect to busyness.

The first seven articles in this series appeared in The Journal for November and December, 1956, and January, February, March, April and May, 1957.

Table 52 • Percentage distribution of independent dentists by average wait for an appointment, 1955

Average wait	Per cent of dentists	Cumulative per cent
No waiting	.2	.2
One or two days	16.6	16.8
Three to six days	18.2	35.0
One week	21.9	56.9
Two weeks	17.9	74.8
Three weeks	9.4	84.2
Four weeks	6.4	90.6
Five weeks	2.2	92.8
Six weeks or more	7.2	100.0

Table 53 • Average wait for an appointment according to description of practice, 1955

Description of practice	Mean no. of days	Median
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	27.3	Four weeks
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked.	14.0	Two weeks
There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care.	9.9	One week
You did not have as many patients as you would have liked.	3.4	One or two days
All independent dentists	12.8	One week

About one of every five respondents was too busy to accommodate all persons who wanted dental care; one of every five felt that he was overworked in meeting the demands for dental care; nearly half stated there was a "good balance" between demand for care and their ability to meet it, and one sixth of the respondents desired more patients. The mean number of additional patients desired by those whose practice was insufficiently busy was 285.

BUSYNESS BY REGION AND STATE

Average wait for an appointment was longest in the Far West (Table 54). The Far West also had the lowest proportion of dentists desiring more patients (Table 55). At the other extreme was the Middle East, where length of wait was the shortest and one fourth of all independent dentists indicated they did not have as many patients as they would have liked.

Using "length of wait" as the measure of dentist busyness, the Far West (1) was followed by the Northwest (2), Central (3), New England (4), Southeast (5), Southwest (6) and Middle East (7). Using percentage of dentists desiring more patients as the criterion of dentist busyness, the rankings are identical except that positions of New England and the Southwest are reversed.

Certain individual states deviated considerably from their regions with respect

Table 54 • Average wait for an appointment in 1955, by region and state

Region and state	Mean no. of days	Median
NEW ENGLAND	12.2	One week
Connecticut	8.0	One week
Maine	*	*
Massachusetts	13.6	One week
New Hampshire	*	*
Rhode Island	*	*
Vermont	*	*
MIDDLE EAST	9.3	One week
Delaware	*	*
District of Columbia	*	*
Maryland	13.9	Two weeks
New Jersey	9.7	One week
New York	7.9	3 to 6 days
Pennsylvania	10.8	One week
West Virginia	13.5	One week
SOUTHEAST	12.0	One week
Alabama	14.0	Two weeks
Arkansas	*	*
Florida	13.1	One week
Georgia	11.4	One week
Kentucky	9.7	One week
Louisiana	10.5	One week
Mississippi	*	*
North Carolina	17.6	Two weeks
South Carolina	*	*
Tennessee	12.7	One week
Virginia	15.0	One week
SOUTHWEST	11.2	One week
Arizona	*	*
New Mexico	*	*
Oklahoma	12.4	One week
Texas	10.0	One week
CENTRAL	14.0	One week
Illinois	11.3	One week
Indiana	14.4	One week
Iowa	16.2	Two weeks
Michigan	16.7	Two weeks
Minnesota	15.2	Two weeks
Missouri	10.0	One week
Ohio	15.7	Two weeks
Wisconsin	12.9	One week
NORTHWEST	15.6	Two weeks
Colorado	13.3	One week
Idaho	*	*
Kansas	17.0	Two weeks
Montana	*	*
Nebraska	14.0	One week
North Dakota	*	*
South Dakota	*	*
Utah	19.2	Two weeks
Wyoming	*	*
FAR WEST	16.0	Two weeks
California	15.4	Two weeks
Nevada	*	*
Oregon	17.8	Two weeks
Washington	17.5	Two weeks
UNITED STATES	12.8	One week

*Too few replies for reliable statistics.

Table 55 • Percentage distribution of independent dentists according to description of practice in 1955, by region

Description of practice	New England	Middle East	South-east	South-west	Central	North-west	Far West	United States
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	18.5	12.3	20.8	21.4	21.8	23.7	22.5	19.4
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked.	18.5	21.2	15.4	15.4	20.4	17.7	18.4	19.1
There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care.	42.1	41.6	46.9	47.4	45.3	48.2	49.6	45.3
You did not have as many patients as you would have liked.	20.9	24.9	16.9	15.8	12.5	10.4	9.5	16.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

to mean number of days of wait for an appointment (Table 54). In Connecticut, for example, the average wait was 8.0 days compared to 13.6 for Massachusetts and 12.2 for all of New England. Dentists in New York reported a shorter waiting period than dentists in any other of the 32 states from which enough replies were received to warrant publication of averages. Dentists in Maryland and West Virginia reported considerably longer average wait for appointments than dentists in the Middle East as a whole. In the Southeast, Kentucky was characterized by a relatively short waiting period and North Carolina and Virginia by relatively long waiting periods. Patients in Missouri were required to wait only 10.0 days for an appointment compared to 14.0 days for the entire Central region. Longest average wait for an appointment, 19.2 days, was reported by dentists in Utah.

Table 56 • Average wait for an appointment in 1955, by type of practice

Type of practice	Mean no. of days	Median
General practitioner	13.1	One week
Specialist	10.9	Three to six days
Oral surgeon	2.6	One or two days
Orthodontist	16.1	Two weeks
Pedodontist	16.1	Two weeks
Periodontist	16.4	Two weeks
Prosthodontist	5.2	Three to six days
All independent dentists	12.8	One week

BUSYNESS BY TYPE OF PRACTICE

"Average wait for an appointment" must be used with care as a measure of busyness according to type of practice. Oral surgeons, for example, can be expected to report short waiting periods because of the character of their practice.

Specialists as a group reported an average wait of 10.9 days compared to 13.1 days for general practitioners (Table 56). The shortest average waiting period, 2.6 days, was reported by oral surgeons, followed by prosthodontists with 5.2 days. The other three specialties of private dental practice, orthodontics, pedodontics and periodontics, all had average waits of approximately 16 days.

Table 57 • Percentage distribution of independent dentists according to description and type of practice, 1955

Description of practice	Type of practice							
	General practitioner	Specialist	Oral surgeon	Orthodontist	Pedodontist	Periodontist	Prosthodontist	All types of practice
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	19.8	13.6	4.4	16.8	26.8	22.2	9.1	19.4
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked.	19.5	14.9	9.6	19.9	4.9	18.5	9.1	19.1
There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care.	44.7	51.9	57.0	47.8	53.7	48.2	54.5	45.3
You did not have as many patients as you would have liked.	16.0	19.6	29.0	15.5	14.6	11.1	27.3	16.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Answers to the "description of practice" question indicated that more oral surgeons (29.0 per cent) and prosthodontists (27.3 per cent) desired additional patients than did dentists in other types of practice (Table 57). These types of practitioners also reported being too busy least frequently.

When the "description of practice" statements shown in Table 57 are assigned numerical values ranging from 1 for dentists desiring more patients to 4 for dentists who could not accommodate all would-be patients, the types of practice score as follows with respect to busyness: periodontists, 2.52; pedodontists, 2.44; general practitioners, 2.43; orthodontists, 2.38; prosthodontists, 2.00 and oral surgeons, 1.89. The score of specialists as a group is 2.23 and the score for all dentists is 2.42.

COMPARISON WITH 1952

The mean number of days of wait for an appointment was reported as 13.6 in 1952 compared with 12.8 in 1955. Consistent with this observation is the change in percentage of dentists desiring more patients, which was 15.4 per cent in 1952 and 16.2 per cent in 1955.

The regional changes that occurred in percentage of dentists desiring more patients indicated that the supply of dental services is becoming more uniform throughout the country, which is also borne out by recent studies of changes in the distribution of dentists. An increase in percentage of dentists desiring more patients occurred in each of the four regions that was below the national average in 1952 (Northwest, Far West, Southwest and Southeast). A decrease occurred in

the percentage of dentists desiring more patients in the Middle East, where the percentage was highest in both 1952 and 1955. The other two regions, New England and the Central region, were practically unchanged.

"Average wait for an appointment" reported by oral surgeons decreased from 3.6 days in 1952 to 2.6 days in 1955. Other decreases were as follows: prosthodontists from 8.4 to 5.2 days; pedodontists from 24.4 to 16.1 days and general practitioners from 13.7 to 13.1 days. Increases in number of days wait required for the initial appointment occurred among orthodontists (from 12.6 to 16.1 days) and periodontists (from 13.6 to 16.4 days).

It is evident from these statistics that during the three-year period ending in 1955, dentists of the United States improved to some extent their ability to meet the demands for dental care. In view of the fact that decreases have occurred in the ratio of dentists to population, it is reasonable to conclude that the individual dentist has increased his patient load more than enough to offset the increase in demand for dental care.

The next and concluding article in this series will be a summary of the findings of the survey.

Support for Science • Support for science involves, to my notion, two things: first, support for real scientific education; and second, support for scientific research. I mean by scientific education the kind of education that leads to understanding of the nature of science and the consequences of science. And you may infer, I think, we have not that kind of education now, at least effectively, so that even our high school graduates or even our college and university graduates really understand the essentials of science. They understand the gadgets, they enjoy the gadgets; they may memorize many scientific facts, but that, of course, is not science—the kind of education that would give to every child, every man and woman an understanding of the nature of science, the spirit, the method, the necessary hesitance in expressing or concluding anything until you know all the facts that can be made known, the necessary patience in establishing your controls, and above all, the absolute honesty required in science. All those things have not yet taken root in the common man.—*Anton J. Carlson, How Can Science Get Support in a Democracy? 1939.*

Book Reviews

A MANUAL FOR THE DETECTION AND CORRECTION OF NUTRITIONAL INADEQUACIES

By Abraham E. Nizel, D.M.D., M.S.D. 28 pages. No price listed. Boston, Tufts University School of Dental Medicine. No publication date shown.

This pamphlet outlines a step-by-step technic for use by dentists who wish to study the dietary habits of patients in order to give dietary guidance.

The outline is divided into two parts, the technic for patients with rampant caries (assumedly, primarily, children) and those with periodontal disease (adults). The instructions are simple and well illustrated with examples and charts. It must be understood, of course, that these instructions are supplementary to others on diet and nutrition which the patient has received.

In general, it would be more consistent with the material included if the author used the term "dietary" regularly instead of "nutritional" in the title and text of the pamphlet and avoided the term "normal" in referring to diets outlined in the recommended dietary patterns.

Dorothea F. Radusch

THE MACMILLAN MEDICAL CYCLOPEDIA

Edited by William A. R. Thomson, 1,013 pages with 16 plates. Price $6.95. New York, The Macmillan Co., 1955.

This comprehensive reference book, of which this is the twenty-second edition, appears in England under the title of *Black's Medical Dictionary*. Its publishers define it as "somewhere in between a technical dictionary of medicine and a book on the household treatment of commoner ailments." The abundant diagrams, charts, illustrations and tables offer much useful information on medical subjects of general interest and answer questions about health topics and medical subjects that arise in the family. The book describes the home treatment of minor ailments that the average person, in the absence of trained supervision, can attend to safely. Technics of first aid and care for minor wounds are explained, bandaging details are diagrammed, and diseases and their danger signals are described. The material appears to be up-to-date and to take into account the many changes which have recently occurred in the medical sciences.

In the preparation of this new edition, the stated aim was to preserve what is good in the old and to add only those recent advances which would appear to be standing the test of time. Among new sections are those on blindness, erythromycin, frozen shoulder, hydrocortisone, retrolental fibroplasia, Siamese twins and phenylbutazone.

The type size is readable, the type style only fair. Paper and cloth binding are adequate.

N. C. Hudson

THE ENCYCLOPEDIA OF CHEMISTRY

Edited by George L. Clark. 1,037 pages with 50 illustrations. Index. $19.50. New York, Reinhold Publishing Corp., 1956.

This unique encyclopedia of modern chemistry contains a most extensive collection of articles on all phases of chemistry and of 20 associated sciences. There is concise coverage of all sciences in which chemistry has made an inroad during our times. This vast reference work is condensed into a single volume and thus constitutes an authoritative presentation of reference material for chemists, engineers, research workers and scientists in all fields. The work contains the newer knowledge of the chemical sciences as well as biographies of great figures in chemistry. Some 500 top contributors have provided the material in a form convenient for everyday reference in the office, laboratory and classroom.

I. Newton Kugelmass

BIOCHEMICAL INDIVIDUALITY

By Roger J. Williams, Ph.D. 214 pages with 17 illustrations. Index. $5.75. New York, John Wiley & Sons, Inc., 1956.

"This book is based upon the need in human biology and medicine for more attention to variability and individuality at the physiological and biochemical levels." Quoted from the preface, this sentence keynotes the text as a whole.

In addition to dealing with biochemical and physiological variation, adequate attention is given to the extent and significance of anatomical variations. Great emphasis is placed

on the genetic basis for both anatomical and biochemical individuality; the latter is dealt with in great detail.

A discussion is included of the interrelated effect of heredity and environment. Nutrition, as an environmental factor in dental caries, is specifically discussed. The approach to this and the other problems is one which the author calls "the genetotrophic" one. He is well qualified by achievement and experience to present this thesis, which he does clearly and convincingly. The subject will appeal to those interested in dental caries research, as well as to those working in biology and biochemistry. The index and reference lists are both generous and valuable. Binding and printing are excellent.

Edward H. Hatton

HEALTH INSURANCE: GROUP COVERAGE IN INDUSTRY

By Richard N. Baisden and John Hutchinson. 76 pages with a chart and 2 tables. 25 cents. Los Angeles, Institute of Industrial Relations, University of California, 1956.

Health insurance, including protection against both medical expense and wage loss resulting from nonoccupational sickness or injury, is ably discussed from the point of view "that for most workers the medical costs and income loss resulting from sickness must somehow be distributed among groups of people and over periods of time."

The development and growth of plans providing protection for the worker are described, beginning with the early workmen's compensation laws and extending up to currently operating health plans, including attempts at national socialization of health care. Discussion of the abuses, inadequacies and dissatisfactions with existing prepayment plans and the need for change from protection against catastrophic illness to provision of complete care is constructive and enlightening. The mutual responsibility of management, labor and the health professions in the future direction of health programs is emphasized, and the relative merits of individual medical practice and group practice also receive attention.

The authors have placed in this compendium of eight chapters a wealth of valuable information and observations that should be available to those interested in the health and security of the 70 million workers in the civilian labor force. The members of the health professions will profit by reading it.

D. W. Brock

HANDBOOK OF HISTOLOGY

By Karl A. Stiles, M.S., Ph.D. Fourth edition. 240 pages with seven pages of illustrations. Index. Appendix. $3. New York, McGraw-Hill Book Co., Inc., 1956.

This book has always been well received by students, particularly as an adjunct to laboratory procedures. It is concise, its context is clearly defined and it is styled for easy reading. Its make-up follows the pattern adopted by textbooks on the same subject. Charts, brief and to the point, are used in certain sections to summarize the structure of a region, so that comparison of regions is made a simple procedure. The illustrations are few and are diagrammatic in form.

New chapters have been added. One chapter explains how to interpret sections and uses drawings to illustrate the variations in the sectioning of material. Although this technic of explanation is new to the book, it is the same as that used in another text on the subject. A second new chapter, "Tissues and Organs Sometimes Confused," is merely a listing in parallel columns of those organs sometimes mistaken for each other. It is possible that the problem of proper identification might be dealt with more effectively in the chapters on the particular structure to be identified. Another new chapter is "Distribution of Cartilage." Here, too, the subject might be handled more effectively in the chapter which discusses cartilage.

This edition, from the standpoint of content, has been but little revised. Many words used in former editions have been replaced by their synonyms. The title is new also.

J. Robert Schumaker

LEHRBUCH DER PSYCHIATRIE: VERHÜTUNG, PROGNOSTIK UND BEHANDLUNG DER GEISTIGEN UND SEELISCHEN ERKANKUNGEN (TEXTBOOK OF PSYCHIATRY: PREVENTION, DIAGNOSIS AND TREATMENT OF MENTAL AND EMOTIONAL DISORDERS)

By Prof. Hans Hoff. Two volumes with 922 pages and 100 illustrations. Index. 56 Swiss francs. Basel, Benno Schwabe & Co., Verlag, 1956.

This work, the eleventh of a series on mental health, contains lectures presented by leading Austrian and Swiss authorities in psychiatry and psychology. These lectures and speeches are intended to provide educational training in psychiatry for students, medical and dental

practitioners, health and welfare workers and employment counselors.

Among the recent publications on these subjects, this book probably is the most up-to-date textbook of European psychiatry. The enthusiasm of the author for his subject and the 536 page history of psychiatry makes this work especially interesting. The successive chapters are written by other, mainly Swiss, contributors and deal with the nature and purpose of modern psychotherapy in general, neuroses, mental health, analytic psychotherapy, psychosurgery and forensic psychiatry.

The author and his collaborators have not drawn their recommendations for psychotherapy from any special school of psychology, but have endeavored to present whatever can be found of special value from research carried out from many points of view.

Emphasis is placed on prevention of emotional disturbances and unfavorable changes of personality. Special technics of treatment, including suggestion, hypnosis, psychoanalysis and various other treatment procedures are discussed in detail.

The case reports presented for study and analysis are well selected and sufficiently evaluated to provide the lay reader with an understanding of the psychobiologic factors involved and of the aims of the treatment indicated.

This textbook is an exceptionally timely work. It is a work written by a group of brilliant and experienced specialists.

The format, type, illustrations and the construction of the book make it less cumbersome than most of the German textbooks, and it is hoped that it will have its deserved success in the English-speaking countries.

Paul H. Glucksman

SCIENTIFIC WRITING

By Meta Riley Emberger and Marian Ross Hall. W. Earl Britton, general editor. 374 pages. Index and appendixes. $4.50. New York, Harcourt, Brace & Co., 1955.

This book concerns the communication of scientific observations. It is intended as a text as well as a reference book.

The first part of the book considers the scientific method; the second, the problems in composition, and the third, different kinds of scientific papers. The book is especially valuable in its emphasis on the logical development of a research project from the perception and formulation of the problem through the collection, analysis and presentation of the data to the reader.

The sections on qualities and elements of scientific style are of value. Sentence structure and diction are presented in relation to logic. A discussion of graphic and pictorial illustration of scientific material is also included.

This book will be helpful to the student, the research worker and the editor of scientific journals. It is also recommended to the scientist who is not a writer but who would like to be able to evaluate better the technical reports he finds in scientific publications.

The format is logical and attractive, and the printing is readable.

Barbara Dunsmore

A SYSTEM OF ENDODONTIA

By L. Castagnola and H. G. Orlay, F.D.S., R.C.S., (Eng.). 143 pages with 86 illustrations. Index. Appendix. 45 shillings. London, Pitman Medical Publishing Co., Ltd., 1956.

The authors have written this booklet expressly for the National Health Service general practitioner in England. They are attempting to acquaint the practitioner with the manner in which endodontics is practiced in the Zürich Dental School.

Viewed from the standpoint of present day methods of practice, the somewhat miscellaneous collection of technics described is of uneven interest. Some methods advocated are obsolete. Other methods are omitted. For example, the text makes no mention of the use of the rubber dam. Then there are such doubtful statements as, "Some workers believe that bacteriological controls should be taken before the filling of the root canal. . . . Although this might seem desirable the authors do not believe it is necessary or practicable in the daily routine of a general practice."

Generally speaking, the level at which the subject is presented is not comparable to that of present day textbooks on endodontics. The book is a collection of thoughts, not a single document organized throughout as a textbook. The result is that it does not hang together. Additionally, the nomenclature is at variance with accepted terminology. The book has a limited index and bibliography, unfortunate omissions in any work of a scientific nature.

It is good to note, however, that an attitude of overemphasis on infection and underemphasis on the efficacy of endodontics has been reversed, and a more conservative attitude toward the pulpless tooth is apparent.

E. Alan Lieban

Current Literature

Identification of dentures in a mental hospital

J. Brayton Lewis. New York D.J. 22:452 Nov. 1956.

With the advent of the brush technic for inserting acrylic resin filling materials, a relatively rapid and completely satisfactory method of inserting a typed number in either acrylic resin or vulcanite dentures has become possible. As the acrylic insert material is transparent, the number shows clearly, is permanent, cannot be removed easily or defaced by the patient and is not disfiguring to the dentures. It finishes smooth and will not irritate physically or chemically. The cost of material is small, no extra equipment is necessary and the time required is about 20 minutes for each denture.

The technic for inserting the number is as follows:

1. The selected number is typed on onionskin paper with the carbon paper reversed so that the number will be black.
2. It is preferable to insert the number buccally to the molar teeth where access and polishing is easier. The palatal or lingual surfaces may be used but are less desirable. The insert should not be placed on the tissue surface.
3. A rectangular region about 2 mm. deep, just large enough for the insert, is cut with a no. 560 bur. With a no. 40 or smaller inverted cone bur, all margins are undercut. The cavity must be clean and have no debris.
4. Wax is sealed over the acrylic resin teeth near the cavity to protect the teeth from monomer.
5. The typed number is adapted to fit the floor of the cavity. If the base of the denture is dark colored vulcanite, white paper is inserted under the number to make it more legible. The number is removed from the cavity, which is then half filled with powdered polymer which is packed into all undercuts and against cavity walls. Five or six drops of monomer are dropped into the cavity to saturate all the powder.

While the material is a thin liquid mix, the typed number is placed in the cavity. Enough powder is added by spatula to absorb most of the free liquid. As the material starts to set, the mix will be cloudy, shine will disappear and shrinkage will occur. The mix is set aside for several minutes. The numbers may be inserted in several dentures in succession at this point, to save time. After each cavity is filled, the denture is left for ten minutes before being polished.

6. Excess material is smoothed off with a rounded rough stone in the handpiece or with a sandpaper cone on a lathe, to restore the original contour of the denture. The denture is polished on a lathe with fine pumice on a felt point, then dry buffed. The inserted material will be clear and the numbers distinct.

Surgical treatment of precancerous lesions of the lip

Bruno W. Kwapis and Malcolm J. Gibson. J. Oral Surg. 14:195 July 1956.

It has been well established that one of the most important factors in cancer control is early diagnosis and eradication of benign lesions which predispose to malignant transformation. The alterations of the labial mucosa with malignant potential represent a response to some form of chronic irritation. The chronicity rather than the type of irritant appears to be the more important factor. Exposure to sun and wind is considered to be the prime etiology. Individuals of light complexion possess an abnormally sensitive skin and mucosa which makes them more susceptible to weather exposure. Leukoplakia and keratosis are the most important mucosal lesions with malignant proclivity. Leukoplakia displays itself clinically as a persistent, diffuse, whitish plaque and keratosis as a more localized, recurrent, crustating lesion.

The term precancerous, as applied to these lesions, connotes the relative probability of malignant transformation. At present, there is no positive histologic method of determining with certainty which of a given series of lesions is destined to become malignant. There are, however, certain histologic features found in the diseased tissue which justify concern. They include hyperkeratosis, parakeratosis of the stratum corneum, acanthosis of the stratum germinativum and dyskeratosis. This latter cellular arrangement is sometimes referred to as "carcinoma *in situ*." The concept of multicentric origin of these lesions is important not only in understanding their pathogenesis but also in effective treatment.

Susceptible patients whose occupation exposes them to the effects of weather should apply protective salves or creams to the lips.

Small precancerous lip lesions can be removed by simple surgical excision. More extensive or diffuse lesions can be managed by an operation referred to as a 'lip shave." This consists in complete excision of the diseased labial mucosa and correction of the defect by extending a mucosal flap from the sulcus region. The cosmetic result is gratifying.

DISCOLORATION OF ACRYLIC DENTURES (ÜBER DIE VERFÄRBUNG VON PALODONPROTHESEN UND IHRE REGENERATION)

M. Kuck. Zahnärztl. Welt & Reform 11/57:258 Aug. 20, 1956.

The color control of inserted dentures is of major importance to the dental profession.

Experience shows that dentures made of acrylic resin sometimes discolor in the mouth after several months, even in instances in which it has been ascertained that no leaky margin or breakage exists. Apparently, the causes of such discolorations are as follows:

1. The restoration may have been processed improperly so that minute bubbles developed. After polishing, these thousands of minute openings were exposed to the saliva and food particles which closed up these openings, and subsequently caused discoloration.

2. Impurities also may have been incorporated in the acrylic resin material during mixing, packing or processing.

3. Foods also may cause variation in color, because of a tendency to excrete sulfides in the saliva which react with the pigment of the acrylic resin color to form new chemical compounds. In some instances, enough sulfide is present in the saliva to change the original color to yellow or brown.

Color stability is one of the most important properties of a denture. It can be impaired by (1) chemical impurity of ingredients; (2) improper chemical processing by the manufacturer; (3) undesirable effects of moisture, oral secretion, foods and drinks; (4) neglected or faulty oral hygiene, and (5) unfavorable consequences of light effects.

The first two factors can hardly be controlled by dentist or patient; the others become evident only after the denture is in actual use. Discoloration caused by surface staining occurs frequently in the dentures of heavy smokers.

At the prosthetic department of the Dental Institute of the University of Frankfurt/Main, Germany, 20 patients, wearing 29 acrylic dentures (upper and lower) were examined. The majority of the dentures were strongly discolored, mainly by absorption of water or water deposits in the macromolecular structure of the material.

In several instances it was possible to regain the original color by repeated applications of calcium chloride under extreme heat.

In serial chemical tests, it was impossible to duplicate the discolorations, and, therefore, it can be assumed that a relation exists between discoloration of acrylic resin dentures and the individual habits or physical conditions of their wearers.

It was established that in 11 of the 20 patients examined, the following systemic diseases either had been or were present: diabetes, leukopenia, bronchitic asthma, gastritis, bacillary dysentery and gallstones.

In two patients in whom discoloration of acrylic resin dentures occurred and disappeared without action by the dentist, it was established that these patients suffered—at the time the discoloration had appeared—from gastritis, pyrosis and ulceration of the stomach.

It was not determined, however, whether food that is rich in acids promotes or accelerates discoloration of acrylic resin dentures.

EFFECTS OF A SINGLE VITAMIN B FRACTION DEFICIENCY—PANTOTHENIC ACID—ON PERIODONTAL TISSUES IN DOGS

A. Astaff, Hermann Becks and A. F. Morgan. Parodontol., Zürich 10:143 Dec. 1956.

Pantothenic acid became known in 1930 through animal experiments conducted by Norris and Ringrose. In 1933, Williams and others prepared extracts of various types of tissue representing different biologic groups, and demonstrated that all these tissues contained a substance which was capable of stimulating yeast growth. This substance, seemingly present in all tissue types, was called "pantothenic acid."

Elvehjem and Koehn demonstrated by the development of dermatitis in chicks, the first symptom associated with pantothenic acid deficiency. Incrustations appeared around the eyes, the corners of the mouth, and between the toes (Ringrose and others). Lesions occurred in the central nervous system, feathering was retarded, and a fatty infiltration of the liver was observed (Phillips and Engel).

The first observation of achromotrichia caused by a well-defined vitamin deficiency was reported by Morgan, Cook and Davidson and was later verified by Lunde and Kringstad.

Roentgenographic and histologic studies

were made of the jaws and teeth of four dogs afflicted with pantothenic acid deficiency. Two dogs were used as normal controls. The duration of the animal experiments was from 140 to 294 days. The actual diet included all vitamins of the B complex with the exception of calcium pantothenate.

The dogs of the normal control group showed no pathologic changes either roentgenographically or histologically.

In the four pantothenic acid-deficient dogs, a tendency to porosity of the jawbones was seen roentgenographically. No caries, malformation of teeth or root resorption was observed.

Histologically, a hyperkeratosis of the epithelium of the interdental papillae which assumed an atypical outline (in comparison with normal control) was determined. There was no inflammation of the underlying connective tissue. The alveolar and supporting bone showed osteoporosis with edema and abundant regions of fat cells.

Recognition of the role of vitamins in the health of oral tissue has become widespread in recent years. Many early nutritional deficiencies manifest themselves in the tissues of the oral cavity.

It is evident that a single factor deficiency of the vitamin B complex can produce changes in the oral cavity of dogs.

These observations, therefore, led to further investigations of patients afflicted with periodontal disease. Studies are now in progress to determine what effect deficiency of pantothenic acid has on periodontal disease in humans.

CONTROL OF THE PRESSURE STROKES AT THE TEMPOROMANDIBULAR JOINT

T. Murphy. Australian D.J. 1:276 Oct. 1956.

Pressure facets were examined in the bony components of the temporomandibular joints of over 100 Australian aboriginal skulls and in the skulls of a typical rodent (Hydrochoerus capybara), a carnivore (Felis leo) and a herbivore (Ovis aries).

In the human skulls, anterior and posterior facets were always found on both bony components: on the articular eminence and postglenoid tubercle in the cranium and on the anterior and postcondylar slopes in the mandible. These facets bore a constant mutual relationship, an observation which suggests that they (1) are separately reciprocal, dividing the joint into functionally separate anterior and posterior regions, and (2) are coupled with the pair on the opposite side.

The masticatory stroke involves three skeletal elements: the posterior teeth, the anterior pair of facets of the contralateral joint and the ipsilateral joint. The posterior slope of the condyle approximates the postglenoid tubercle at the beginning of the stroke. This position is reached by retracting motor units reflexly triggered by the load on the reciprocal posterior teeth. The postglenoid tubercle acts as a fulcrum for the pivoting condyle, and, therefore, as a fulcrum for the masticatory stroke. The incisive stroke also involves three skeletal elements: the front teeth and the anterior joint region of both sides.

It is postulated that the joint region vacated by the condyle during each pressure stroke is filled by the articular disk.

Pressure facets in the temporomandibular joints of a rodent, a carnivore and a herbivore, and deductions from the known masticatory habits of these animals, corroborate the inferences drawn from the human material.

James Springer

AN ANALYSIS OF BUSINESS PROCEDURES

Victor H. Frank. J. Oral Surg. 15:142 April 1957.

The primary requisites for serving patients and the doctors who refer them are diagnostic ability, operative skill and a continuing study of the basic sciences. Adequate business procedures also are needed.

Office expenses and percentage of overhead may be figured according to the average fee or on the basis of percentage of overhead per patient. Deductible items for income tax purposes include: depreciation (the net cost of refurnishing or adding new equipment and instruments can be ascertained with a depreciation figure), convention trips, entertainment and automobile cost and maintenance.

Suggestions for improved office procedure include an illustrated day sheet for use in determining work performed, money collected and a double checking on outstanding accounts. A card sample of the dentist's file and a graph showing volume of work and the irregularities of work are useful. Methods are given to check removal of sutures and dressings, to check biopsies and the necessary follow-up.

Statistics can be used to apply business methods to inventory control and the purchase of supplies.

Victor H. Frank

Deaths

Adams, Frederick W., Cedar Rapids, Iowa; Northwestern University Dental School, 1913; died July 16, 1956; aged 67.

Adams, Thomas O., Massillon, Ohio; Ohio State University College of Dentistry, 1931; died January 7; aged 55.

Appleby, Ray, Salinas, Calif.; North Pacific College of Oregon, School of Dentistry, Portland, 1915; died September 1956; aged 63.

Armour, Ross A., Tampa, Fla.; Northwestern University Dental School, 1914; died December 2, 1956; aged 66.

Avery, George E., Cherokee, Iowa; University of Pennsylvania School of Dentistry, 1908; died July 29, 1956; aged 73.

Barr, David W., Cleveland; University of Michigan College of Dental Surgery, 1909; died January 20; aged 69.

Barry, Wilfred B., Alexandria, La.; New Orleans College of Dentistry, 1905; died January 7; aged 75.

Berg, Charles E., East St. Louis, Ill.; St. Louis University School of Dentistry, 1915; died December 22, 1956; aged 68.

Branham, William C., Edmond, Okla.; died January 16; aged 90.

Bricker, Clyde M., Park Falls, Wis.; Marquette University Dental School, 1903; died August 23, 1956; aged 77.

Brown, James E., Oklahoma City; Western Dental College, Kansas City, 1918; died January 22; aged 60.

Burge, James N., Centralia, Ill.; Northwestern University Dental School, 1935; died October 14, 1956; aged 44.

Burgess, Henry W., Chicago; Chicago College of Dental Surgery, Loyola University, 1906; died January 6; aged 77.

Bush, William W., Belmont, N. Y.; University of Buffalo School of Dentistry, 1903; died January 17; aged 74.

Carman, Robert C., Fishkill, N. Y.; New York University College of Dentistry, 1931; died January 1; aged 50.

Carter, Fletcher W., Sedalia, Mo.; Washington University School of Dentistry, St. Louis, 1905; died January 2; aged 73.

Chuck, George C., Long Beach, Calif.; University of California College of Dentistry, 1922; died January 30; aged 59.

Combs, Warren S. P., Middletown, Del.; University of Maryland, 1909; died January 18; aged 76.

Conner, Glenn G.; Rockford, Ill.; Chicago College of Dental Surgery, Loyola University, 1915; died January 9; aged 62.

Cooper, Russell E., Sauk Centre, Minn.; Marquette University Dental School, 1919; died December 29, 1956; aged 60.

Cruse, Milton. Chicago; Northwestern University Dental School, 1914; died February 17; aged 66.

Daly, William G., Kansas City, Kan.; Kansas City-Western Dental College, 1925; died January 24; aged 54.

Darlington, Lewis W., Lansdowne, Pa.; University of Pennsylvania School of Dentistry, 1899; died January 26; aged 80.

Davis, Thomas J., South Ozone Park, N. Y.; died January 14; aged 77.

Dellinger, Fred E., Cincinnati; Cincinnati College of Dental Surgery, 1908; died December 14, 1956; aged 76.

Denvir, William E., Somerville, Mass.; died May 23, 1956; aged 73.

Desmond, Frank G., Chicago; Northwestern University Dental School, 1909; died January 27; aged 70.

Dickson, William B., Buffalo; University of Buffalo School of Dentistry, 1896; died December 26, 1956; aged 90.

Diller, William S., Louisville, Ky.; Louisville College of Dentistry of Centre College, 1908; died January 28; aged 74.

Dix, Ray M., Chicago; Northwestern University Dental School, 1919; died July 31, 1956; aged 60.

Dixon, John T., Chicago; Northwestern University Dental School, 1897; died January 16; aged 89.

Dorsey, Charles W., Philadelphia; Howard University College of Dentistry, 1911; died September 1956; aged 70.

Dow, Edgar L., Oakland, Calif.; College of Physicians and Surgeons, San Francisco, 1917; died January 30; aged 63.

Dreifus, Max, New York; University of Illinois College of Dentistry, 1939; died November 8, 1956; aged 57.

Drury, Andrew C., Newark, N. J.; University of Pittsburgh School of Dentistry, 1913; died January 20; aged 68.

Erwin, Robert M., St. Petersburg, Fla.; Pennsylvania College of Dental Surgery, Philadelphia, 1897; died January 18; aged 83.

Fankhauser, Homer E., Woonsocket, S. D.; Northwestern University Dental School, 1908; died January 12; aged 81.

Fischer, George, Pittsburgh; Ohio College of Dental Surgery, University of Cincinnati, 1897; died January 22; aged 82.

Forrest, Frederick A., New Britain, Conn.; Philadelphia Dental College, 1900; died January 20; aged 80.

Franta, William F., Cicero, Ill.; Chicago College of Dental Surgery, Loyola University, 1926; died February 3; aged 55.

Freeman, Allen J., Spokane, Wash.; Chicago College of Dental Surgery, Loyola University, 1892; died November 7, 1956; aged 88.

Gamble, Burton L., St. Petersburg, Fla.; Kansas City-Western Dental College, 1895; died December 2, 1956; aged 85.

Gard, George R., Ord, Neb.; Omaha Dental College, 1901; died January 14; aged 77.

Garvin, Walter, Washington, D. C.; Howard University College of Dentistry, 1918; died January 16; aged 61.

Gaskin, Floyd H., Pittsburgh; University of Pittsburgh School of Dentistry, 1925; died December 30, 1956; aged 68.

Getty, Gorman E., Lonaconing, Md.; University of Pittsburgh School of Dentistry, 1915; died January 14; aged 68.

Gevirtz, Jasper, Hammond, Ind.; Indiana Dental College, 1922; died February 1; aged 56.

Gordon, Sextus J., Mobile, Ala.; Vanderbilt University School of Dentistry, 1894; died November 4, 1956; aged 82.

Gould, Gail I., Chicago; Northwestern University Dental School, 1917; died January 11; aged 60.

Gregg, Harry V., Schenectady, N. Y.; University of Pennsylvania School of Dentistry, 1911; died January 3; aged 70.

Gregg, Robert J., Los Angeles; Philadelphia Dental College, 1908; died December 26, 1956; aged 78.

Haley, John Patrick, Marion, Ala.; Birmingham Dental College, 1897; died September 11, 1956; aged 87.

Hall, Arthur R., Camden, N. J.; George Washington University Dental Department, 1916; died August 26, 1956; aged 63.

Harmstead, Gordon K., Mt. Vernon, Ohio; Vanderbilt University School of Dentistry, 1918; died December 28, 1956; aged 65.

Haskett, Laurence F., Indianapolis; Indiana Dental College, 1914; died January 19; aged 66.

Hauck, Oscar W., Chatfield, Minn.; University of Minnesota College of Dentistry, 1910; died January; aged 68.

Hays, Ralph L., Wooster, Ohio; Ohio State University College of Dentistry, 1924; died January 13; aged 60.

Hebberd, Arthur G., Minneapolis; Chicago College of Dental Surgery, Loyola University, 1892; died December 11, 1956; aged 83.

Hechtmann, Joseph A., Philadelphia; Medico-Chirurgical College of Philadelphia Department of Dentistry, 1910; died January 30; aged 75.

Henderson, Francis R., Everett, Mass.; Tufts University School of Dental Medicine, 1910; died January; aged 71.

Heptig, Albert S., Horton, Kan.; Kansas City Dental College, 1908; died January 7; aged 71.

Hester, James L., Coral Gables, Fla.; Atlanta-Southern Dental College, 1928; died February 1; aged 52.

Hicks, Gard F., Loveland, Colo.; University of Iowa College of Dentistry, 1894; died January 20; aged 89.

Hoatson, John M., Grants Pass, Ore.; North Pacific College of Oregon, School of Dentistry, Portland, 1935; died August 9, 1956; aged 51.

Hogan, Edmonde M., New Castle, Neb.; University of Iowa College of Dentistry, 1899; died November 8, 1955; aged 84.

Holland, Norman Earl, Robstown, Texas; Baylor University College of Dentistry, 1927; died November 18, 1956; aged 51.

Hood, Jay F., Bellevue, Pa.; died April 3, 1956; aged 75.

Horne, Harry J., Monticello, Wis.; died April 10, 1956; aged 69.

Houchen, Stephen A., Olney, Ill.; Marion-Sims Dental College, St. Louis, 1904; died October 21, 1956; aged 77.

Huff, Ralph T., St. Petersburg, Fla.; Northwestern University Dental School, 1904; died January 29; aged 74.

Hunter, William L., Helena, Mont.; North Pacific College of Oregon, School of Dentistry, Portland, 1908; died July 22, 1956; aged 69.

Hutchins, Herbert O., Lyndonville, Vt.; University of Pennsylvania School of Dentistry, 1899; died November 3, 1956; aged 82.

Hymel, Raoul S., New Orleans; Tulane University of Louisiana, College of Medicine, School of Dentistry, 1908; died 1956.

Jackson, George H., Butler, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1891; died January 3; aged 88.

Johnson, Ervin A., Vero Beach, Fla.; Boston Dental College, 1897; died January 21; aged 83.

Johnson, Frederick H., Sumner, Wash.; Pennsylvania College of Dental Surgery, Philadelphia, 1899; died January 5; aged 80.

Johnson, Herman L., Gowrie, Iowa; University of Iowa College of Dentistry, 1911; died November 25, 1955; aged 68.

Jones, Irwin L., Galveston, Texas; Dental Department of Meharry Medical College, 1919; died October 2, 1956; aged 57.

Jones, William B., Jr., Philadelphia; University of Pennsylvania School of Dentistry, 1943; died September 23, 1956; aged 37.

Joyce, John C., Baltimore; Baltimore College of Dental Surgery, University of Maryland, 1900; died approx. January 10; aged 79.

Kaufman, Jerome, Brooklyn; died January 14; aged 29.

Kern, Wallace H., New Orleans; Loyola University School of Dentistry, New Orleans, 1932; died January 6; aged 46.

Keys, Robert E., Berkeley, Calif.; University of California College of Dentistry, 1904; died February 10; aged 84.

Keyser, Edward H., Front Royal, Va.; Medical College of Virginia School of Dentistry, 1915; died November 2, 1956; aged 63.

Klauber, Phillip W., Buffalo; New York College of Dentistry, 1916; died January 26; aged 66.

Kluetz, Rudolph H., Merrill, Wis.; Marquette University Dental School, 1918; died January 14; aged 64.

Konovitz, Morris J., Mariners Harbor, S. I., New York; New York College of Dentistry, 1915; died January 24; aged 64.

Krohn, Benjamin, Chicago; Chicago College of Dental Surgery, Loyola University, 1927; died February 17; aged 52.

Kuhn, William K., Seattle; North Pacific College of Oregon, School of Dentistry, Portland, 1939; died December 28, 1956; aged 42.

Landess, Eugene S., Fayetteville, Tenn.; Northwestern University Dental School, 1902; died January 21; aged 77.

Law, Joseph A., Towanda, Pa.; Temple University School of Dentistry, 1924; died January 14; aged 60.

Leonard, Norris C., Nashville, Tenn.; Vanderbilt University School of Dentistry, 1890; died January 6; aged 88.

Le Sage, George A., Superior, Wis.; Marquette University Dental School, 1927; died January 22; aged 53.

Letson, Russell C., Inglewood, Calif.; Chicago College of Dental Surgery, Loyola University, 1919; died January 2; aged 59.

Levene, Benjamin F., New York; New York College of Dentistry, 1905; died January 14; aged 72.

Luttio, Vaino A., Erskine, Minn.; University of Minnesota College of Dentistry, 1920; died December 23, 1956; aged 61.

MacEntee, John L., Hartford, Conn.; University of Pennsylvania School of Dentistry, 1915; died January 15; aged 63.

Maness, James F., Tulsa, Okla.; Western Dental College, Kansas City, 1916; died January 19; aged 66.

Markert, Albert J., Hollywood, Calif.; St. Louis University School of Dentistry, 1919; died January 8; aged 61.

McCann, George C., Danville, Ill.; Northwestern University Dental School, 1905; died February 3; aged 74.

McKee, Henry Robinson, Pittsburgh; died October 19, 1956; aged 80.

McNary, Ralph H., Marblehead, Mass.; Tufts University School of Dental Medicine, 1918; died January 26; aged 60.

McPherson, Virgil I., Elma, Wash.; North Pacific College of Oregon, School of Dentistry, Portland, 1923; died January 30; aged 56.

Menges, John B., Fullerton, Calif.; University of Southern California, College of Dentistry, 1918; died January 11; aged 60.

Meyer, Charles Edwine, LeClaire, Iowa; University of Iowa College of Dentistry, 1903; died January 31, 1956; aged 81.

Miller, Bernard T., Connellsville, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1908; died January 12; aged 75.

Mills, Edward C., Columbus, Ohio; University of Michigan College of Dental Surgery, 1889; died January 22; aged 89.

Morris, Wade Allen, Graham, Texas; died January 20; aged 83.

Nedrud, Harlow J., Minot, N. D.; University of Minnesota College of Dentistry, 1922; died January 15; aged 57.

Nelson, Howard A., Euclid, Ohio; University of Michigan College of Dental Surgery, 1919; died January 15; aged 58.

Newlin, Chester I., Denver; University of Denver School of Dentistry, 1918; died January 24; aged 61.

Newton, Herman C., Chicago; Northwestern University Dental School, 1901; died July 1, 1956; aged 80.

Nolan, Willard E., Austin, Texas; Marquette University Dental School, 1923; died December 25, 1956; aged 56.

Olafsson, Olaf J., La Grange, Ill.; Northwestern University Dental School, 1905; died February 17; aged 75.

Opperman, Albert M., West Haven, Conn.; University of Iowa College of Dentistry, 1941; died January 13; aged 40.

Ottolenghi, Renato, New York; St. Louis University School of Dentistry, 1922; died September 1956; aged 58.

Park, William E., Akron, Ohio; Ohio State University College of Dentistry, 1916; died January 19; aged 65.

Parker, Wallace J., Wooddale, Ill.; died March 27, 1956; aged 63.

Pasette, Alvin J., Los Angeles; Washington University School of Dentistry, St. Louis, 1919; died January 20; aged 58.

Paulsen, Paul R., Gering, Neb.; University of Nebraska College of Dentistry, 1926; died January 5; aged 55.

Peterson, Harley R., Des Moines, Iowa; died June 25, 1955; aged 67.

Phillips, Frederick H., Reno, Nev.; Western Dental College, Kansas City, 1905; died January 24; aged 76.

Pierce, Bert G., Oregon, Mo.; Western Dental College, Kansas City, 1901; died January 23; aged 77.

Pranter, Victor O., Springfield, Mo.; Western Dental College, Kansas City, 1905; died January 8; aged 83.

Price, Wayne B., Huntington, W. Va.; University of Pennsylvania School of Dentistry, 1921; died January 9; aged 58.

Quinlan, William A., Seattle; Chicago College of Dental Surgery, Loyola University, 1907; died November 8, 1956; aged 76.

Ratner, David J., Oak Park, Ill.; Northwestern Dental School, 1916; died January 26; aged 64.

Reed, Forrest D., Chicago; Northwestern University Dental School, 1898; died October 14, 1956; aged 82.

Rich, John M., Seattle; University of Michigan College of Dental Surgery, 1898; died January 17; aged 85.

Ridgway, Shessie W., Coatesville, Pa; University of Pennsylvania School of Dentistry, 1892; died December 11, 1956; aged 84.

Robinson, Ernest A., Clendenin, W. Va.; Ohio College of Dental Surgery, University of Cincinnati, 1916; died January 20; aged 84.

Ross, Gordon H., Gary, Ind.; Indiana Dental College, 1923; died January 2; aged 60.

Rowe, Willard Mariner, Waltham, Mass.; Harvard University Dental School, 1899; died January 13; aged 86.

Sager, John P., Lansdowne, Pa.; Pennsylvania College of Dental Surgery, Philadelphia, 1892; died January 29; aged 89.

Sallada, Earle J., Philadelphia; University of Pennsylvania School of Dentistry, 1891; died January 28; aged 85.

Salm, Welton Lee, La Grange, Texas; Texas Dental College, Houston, 1937; died December 26, 1956; aged 42.

Schumacher, Eric W., New York; New York College of Dentistry, 1915; died December 26, 1956; aged 66.

Schwartz, Max M., Jersey City; Baltimore College of Dental Surgery, University of Maryland, 1923; died January 30; aged 58.

Sears, Herbert C., Danville, Ind.; Central College of Dentistry, Indianapolis, 1900; died January 23; aged 78.

Sevier, Charles A., Jackson, Tenn.; Vanderbilt University School of Dentistry, 1892; died December 30, 1956; aged 86.

Shamansky, Isaac, Mt. Vernon, Ohio; Ohio State University College of Dentistry, 1930; died December 7, 1956; aged 49.

Shapiro, Arthur, Brooklyn; New York University College of Dentistry, 1926; died January 4; aged 54.

Shutters, Abram A., Edinburg, Va.; Baltimore College of Dental Surgery, University of Maryland, 1926; died January 10.

Silknitter, John P., Enumclaw, Wash.; Northwestern University Dental School, 1913; died January 17; aged 67.

Simmons, Howard L., Chicago; Chicago College of Dental Surgery, Loyola University, 1896; died January 21; aged 82.

Smith, James F., Terre Haute, Ind.; Indiana University School of Dentistry, 1928; died January 9; aged 52.

Smukler, Harry, Philadelphia; Temple University School of Dentistry, 1935; died January 13; aged 46.

Stevens, Franklin K., Connellsburg, Pa.; University of Pennsylvania School of Dentistry, 1893; died January 16; aged 93.

Stimmel, George, Souderton, Pa.; Pennsylvania College of Dental Surgery, Philadelphia, 1905; died October 1, 1956; aged 71.

Stone, Otho L., Eureka, Calif.; University of Denver School of Dentistry, 1915; died January 9; aged 65.

Summerlin, Maxie T., Athens, Ga.; Atlanta Dental College, 1908; died December 16, 1956; aged 72.

Taber, Rae K., New Bedford, Mass.; Tufts University School of Dental Medicine, 1926; died January 8; aged 54.

Taylor, Leonard C., Palisade, Colo.; Kansas City-Western Dental College, 1922; died December 9, 1956; aged 57.

Thompson, Earl A., San Diego; University of Minnesota College of Dentistry, 1914; died December 31, 1956; aged 65.

Tomhave, Elmar J. G., Cloquet, Minn.; University of Minnesota College of Dentistry, 1926; died December 7, 1956; aged 56.

Veatch, Henry C., San Francisco; College of Physicians and Surgeons, San Francisco, 1916; died January 23; aged 68.

Vedder, Neil D., Carrollton, Ill.; University of Michigan College of Dental Surgery, 1901; died January 22; aged 76.

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Gerard J. Casey, Secy., 222 E. Superior St., Chicago

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Gerard J. Casey, Secy., 222 E. Superior St., Chicago

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Peter C. Goulding, Secy., 222 E. Superior St., Chicago

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Orthodontics and Oral Development: Clifford L. Whitman, 268 Moore St., Hackensack, N.J.

Pedodontics: William W. Demeritt, School of Dentistry, University of North Carolina, Chapel Hill, N.C.

Periodontics: Evert A. Archer, 55 E. Washington St., Chicago

Practice Administration: Harry M. Klenda, First National Bank Bldg., Wichita, Kan.

Prosthodontics, Complete: Vincent Trapozzano, 3900 Central Ave., St. Petersburg, Fla.

Prosthodontics, Partial: Douglas H. Yock, School of Dentistry, University of Minnesota, Minneapolis

Public Health Dentistry: Rulon W. Openshaw, 6703 Melrose Ave., Los Angeles

Research: Alton K. Fisher, College of Dentistry, State University of Iowa, Iowa City

Roentgenology: Donald T. Waggener, 800 S. 13th St., Lincoln, Neb.

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois
WHitehall 4-6730

LON W. MORREY, *Editor* JOHN J. HOLLISTER, *Business Manager*

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Advertising copy must conform to the official standards established by the American Dental Association. Notice of change of address should be received one month before the change is to be effective. Orders for reprints of Journal articles must be received by the Business Manager's office not later than the 15th of the month of issue in order to secure advantage of the lowest possible prices. Orders received after this date are subject to special quotation.

Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York
One-Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	Oct. 16-19, 1961	Philadelphia

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 24-26, 1958	Montgomery	C. R. Crook	Professional Center, Montgomery
Alaska	June 5-8	Ketchikan	C. L. Polley	Box 1896, Juneau
Arizona			W. G. Burke	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 13-16, 1958	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 20-23, 1958	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 14-16, 1958	Los Angeles	S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 6-9	Colorado Springs	G. H. Jackson	724 Republic Bldg., Denver
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			A. G. Schiek	3716 Philadelphia Pike, Claymont
District of Columbia	Mar. 9-12, 1958	Washington	J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 18-21, 1958	Miami Beach	G. J. Perdigon	17 Davis Blvd., Tampa
Georgia	Sept. 29-Oct. 2	Atlanta	J. W. Yarbrough	Southern United Bldg., Macon
Hawaii	June	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho			M. R. Johnson	1606 E. Center St., Pocatello
Illinois			P. W. Clopper	632 Jefferson Bldg., Peoria
Indiana			W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa			H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas			F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky			A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana			J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 20-22	Kennebunkport	S. M. Gower	Box 27, Skowhegan
Maryland			C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts			H. E. Tingley	12 Bay State Rd., Boston 15
Michigan	Apr. 28-30, 1958	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 14-16, 1958	St. Paul	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4
Mississippi			B. A. Cohen	500-E E. Woodrow Wilson Dr., Jackson 27
Missouri			E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana			E. G. Vedova	Box 311, Roundup
Nebraska			F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada			O. M. Selfert	755 Ryland Ave., Reno
New Hampshire	June 16-19	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 11-15, 1958	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico			J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York			C. A. Wilkie	1 Hanson Pl., Brooklyn 17
North Carolina			L. H. Butler	Jefferson Bldg., Greensboro
North Dakota			J. H. Pfister	419½ Dakota Ave., Wahpeton

State	Date	Place	Secretary	Address
Ohio	Oct. 6-9	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20-23, 1958	Oklahoma City	L. D. Wright	Osler Bldg., Oklahoma City
Oregon	Mar. 3-5, 1958	Portland	T. D. Holder	Selling Bldg., Portland
Panama Canal Zone			A. L. Robertson	5700 USAF Dispensary, Albrook Air Force Base
Pennsylvania			M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	January 1958		R. Borges	Box 843, Arecibo
Rhode Island	January 1958	Providence	W. F. Decesare	216 Broadway, Providence
South Carolina			J. E. Wallace	1420 Gregg St., Columbia
South Dakota	May 11-14, 1958	Mitchell	R. E. Decker	Box 308, Parker
Tennessee			A. M. Ballentine	215 W. Flower St., Pulaski
Texas				3707 Gaston Ave., Dallas 10
Utah			R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont			E. H. Van Santvoord	22 Washington St., Rutland
Virginia	May 4-7, 1958	Richmond	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington	Mar. 31-Apr. 2, 1958	Seattle	W. P. Brust	211 Medical & Dental Bldg., Seattle
West Virginia	July 21-24	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 21-23, 1958	Milwaukee	H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June 13-15	Sheridan	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 9-14* June 10, 11†	Birmingham	W. L. McCarty	Professional Center, Montgomery
Alaska	July 9-12*†	Anchorage	R. H. Williams	Box 2122, Juneau
Arizona	June 24-28* June 26†	Florence	W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas	June 17-21	Little Rock	W. T. Jones	107 E. Shelton, Monticello
California	June 24 July 29	Los Angeles San Francisco	D. R. Grant	507 Polk St., San Francisco
Colorado	June 24-28‡		R. F. Gilmore	Republic Bldg., Denver 2
Connecticut	June 24-26* June 28, 29* June 27-29†	Boston Bridgeport Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 24*† June 25-27*†	Philadelphia Wilmington	P. K. Musselman W. T. Birthright	143 W. Main St., Newark 1835 Eye St., N.W., Washington
District of Columbia				
Florida	July 8-18*†	Jacksonville	R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia			W. G. Brown	Blackshear
Hawaii	Aug. 29-Sept. 2*†	Honolulu	J. Y. Ing	210 James Campbell Bldg., Honolulu
Idaho	June 17-19	Boise	A. G. DeWinter	Sun Bldg., Boise
Illinois	June 25-28*†		W. A. McKee	Wood Bldg., Benton
Indiana	June 11-14*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa			P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas	June 3-6	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 10-13*†	Louisville	J. J. Kelly	102 W. Madison St., Franklin
Louisiana	June 2-7‡		R. C. Steib	Maison Blanche Bldg., New Orleans
Maine	June 17-19	Boston	A. S. Appleby	Box 260, Skowhegan
Maryland	June 10-12‡		H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts	June 18-21*‡ June 20, 21†‡		A. M. Bommer	349 Broadway, Revere
Michigan	June 9-15	Ann Arbor	J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota	June 17-21*†	Minneapolis	M. G. Walls	Lowry Bldg., St. Paul
Mississippi	June 18-20*†	Jackson	J. C. Boswell	Medical Arts Bldg., Jackson
Missouri	June 10-15, 17, 18* June 10, 13, 17, 18†	Kansas City	R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena
Nebraska	June 10-14	Lincoln	H. E. Weber	Stuart Bldg., Lincoln

State	Date	Place	Secretary	Address
Nevada	June 24	Reno	A. A. Cozzalio	130 N. Virginia, Reno
New Hampshire	June 20, 21*	Boston	S. G. Markos	8 Renaud Ave., Dover
	June 20†			
New Jersey	June 10, 11*	Philadelphia	C. J. Schweikhardt	150 E. State St.,
	June 14, 15*	Trenton		Trenton 8
	June 18, 19*	New York		
	June 26, 27*	Philadelphia		
	May 31, June 1†	Teaneck		
New Mexico	June 24-27	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	July 1, 2, 9-12*‡		D. W. Beier	23 S. Pearl St.,
	July 1, 2, 9, 10†‡			Albany 7
	Dec. 10-13*‡			
North Carolina	June 24*†	Chapel Hill	J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 8-12	Fargo	T. M. Flath	312 Main St., Williston
Ohio			D. E. Bowers	322 E. State St., Columbus 15
Oklahoma	June 17-19*	Oklahoma City	W. E. Cole	2420 N. Meridian,
	June 17, 19†			Oklahoma City
Oregon	June 10-13*†	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	June 16-21*	Philadelphia	R. E. V. Miller, Sr.	Dept. of Public Instruction,
	June 16-19†	Pittsburgh		Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Comercio St. #452,
				San Juan
Rhode Island			F. M. Hackett	267 Academy Ave.,
				Providence
South Carolina	June 13-15	Columbia	J. L. Gunter	1226 Pickens St., Columbia 1
South Dakota	June 23-26*†	Sioux Falls	H. T. Aker	Canton
Tennessee	June 10-15	Memphis	C. R. Alta	Bennie-Dillon Bldg.,
				Nashville
Texas	June 1-8*	Houston	R. T. Weber	Capitol National Bank
	June 1-4†			Bldg., Austin 16
Utah	June 24-30‡		A. Ridge, Jr.	10 S. Second E., Provo
Vermont	June 24-26*†	Burlington	P. M. Fitch	Newport
Virginia	June 10-15*	Richmond	J. M. Hughes	Medical Arts Bldg.,
	June 10, 11†			Richmond
Washington	June 24-27	Seattle	F. S. Rotchford	1108 S. Washington St.,
				Olympia
West Virginia	June 24-26	West Liberty	C. C. Cottrill	Box 111, Glen Rogers
Wisconsin	June 3-7*†	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Gold Foil Operators	Nov. 1, 2	Miami, Fla.	R. B. Wolcott] Secy.	Navy Dental Tech. School, Naval Training Center, San Diego, Calif.
American Academy of Implant Dentures	Nov. 2-4	Miami, Fla.	P. S. Loechler Secy.	540 N. California, Stockton, Calif.
American Academy of Oral Roentgenology	Nov. 1, 2	Miami Beach, Fla.	H. M. Berry, Jr. Secy.	4001 Spruce St., Philadelphia 4
American Academy of Periodontology	Oct. 31-Nov. 2	Miami, Fla.	C. E. Chamberlain Secy.	1101 N. North St., Peoria, Ill.
American Association of Dental Examiners	Nov. 1, 2		C. A. Bumstead Secy.	Stuart Bldg., Lincoln, Neb.
American Board of Oral Pathology	Dec. 7, 8		D. A. Kerr Secy.	University of Michigan, School of Dentistry, Ann Arbor, Mich.
American Board of Pedodontics	July 25-27	San Francisco	R. L. Ireland Secy.	College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American College of Dentists	Nov. 3	Miami Beach, Fla.	O. W. Brandhorst Secy.	4221 Lindell Blvd., St. Louis 8
American Dental Assistants Association	Nov. 4-7	Miami Beach, Fla.	M. L. Martin Exec. Secy.	First National Bank Bldg., LaPorte, Ind.
American Dental Society of Europe	Aug. 28-31	Lausanne, Switzerland	J. P. Molony Secy.	110 Harley St., London W. 1, England
American Denture Society	Nov. 1-3	Miami Beach, Fla.	V. L. Steffel Secy.	College of Dentistry, Ohio State University, Columbus, Ohio
American Institute of Dental Medicine	Oct. 13-17	Palm Springs, Calif.	M. G. Lewis Exec. Secy.	2240 Channing Way, Berkeley 4, Calif.
American Public Health Association	Nov. 11-15	Cleveland	R. M. Atwater Exec. Secy.	1790 Broadway, New York 19

Name	Date	Place	Secy. or Chm.	Address
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 28	New York	M. H. Feldman Exec. Secy.	730 Fifth Ave., New York 19
American Society of Oral Surgeons	Oct. 30-Nov. 2	Miami Beach, Fla.	A. B. Coxwell Exec. Secy.	2208 Dundee Rd., Louisville 5, Ky.
Asociacion Odontologica Argentina, Thirteenth Jornadas	Oct. 14-17	Buenos Aires	J. M. Lueje Secy.	959 Junin, Buenos Aires, Argentina
Berkshire Conference in Oral Pathology and Periodontology	June 16-20	Lenox, Mass.	I. Glickman Dir.	Tufts University, School of Dental Medicine, 136 Harrison Ave., Boston 11
British Dental Association	July 1-5	Newcastle on Tyne, England	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London W. 1, England
Canadian Dental Association in cooperation with Western Canada Dental Society	June 23-26	Winnipeg, Canada	D. W. Gullett Secy.	Canadian Dental Association, 234 St. George St., Toronto 5, Ont., Canada
Chicago Dental Society	Feb. 2-5, 1958	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Oct. 4, 5		S. Peterson Secy.	222 E. Superior St., Chicago
European Organization for Research on Fluorine and Dental Caries Prophylaxis, Fourth Meeting	June 8-10	Malmo, Sweden	H. J. Schmidt	Obere Weinsteige 5, Stuttgart-Degerloch, Germany
European Orthodontological Society	Aug. 29-Sept. 2	Geneva, Switzerland	E. Fernex	1 Place du Port, Geneva, Switzerland
Federation Dentaire Internationale 45th Annual Meeting	Sept. 6-14	Rome, Italy	G. H. Leatherman Secy. Gen'l	35, Devonshire Pl., London, W. 1., U.K.
Fifteenth Congres Francais de Stomatologie	Sept.	Paris, France	J. Bara Gen. Secy.	30, Ave. Felix Faure, Paris 15, France
Mexican Dental Association, Fourth Congress	Nov. 10-14	Mexico City	E. Martinez R. Secy.	Sinaloa 9, Mexico, D.F.
Mid-Continent Dental Congress	Nov. 17-20	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave., St. Louis 5
National Board of Dental Examiners	Dec. 2, 3		G. J. Casey Secy.	222 E. Superior St., Chicago
National Dental Association	Aug. 4-8	Hot Springs, Ark.	J. A. Jackson Secy.	P.O. Box 197, Charlottesville, Va.
New England Dental Society	Oct. 16, 17	Boston	F. L. Finley, Jr. Secy.	43 Farmington Ave., Hartford, Conn.
New Orleans Dental Conference	Nov. 10-14	New Orleans	E. Burvant Secy.	Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Oct. 21, 22	Buffalo	D. Mossberg Secy.	36 Central Park S., New York
Norwegian Dental Association, Annual Meeting	Oct.	Oslo, Norway	K. Gard Secy.	Incognitogatan 17, Oslo, Norway
Odontologica Federation of Central America and Panama	Sept. 11-14	Guatemala, C.A.	A. Hurtarte E. Secy.	4a Avenida No. 12-47, Zona 1, Guatemala, C.A.
Osterreichische Zahnarztetagung	Oct.	Krems/Niederosterreich, Austria	H. Kränzl	25a Währingerstrasse, Vienna 9, Austria
Pacific Coast Dental Conference	Aug. 19-22	San Diego	C. W. Gilman Secy.	219 E. 8th St., National City, Calif.
Pacific Coast Society of Prosthodontists	Aug. 15-17	San Diego	A. W. Spaulding Secy.	4350 11th Ave., Los Angeles 8
Third International Medical and Surgical Meetings—International Medical and Health Exhibition	June 1-9	Turin, Italy	B. Roccia Dir.	Dentistry Clinic, University of Turin, Corso Polonia 2, Turin, Italy
Thirty-First Journees Dentaires Internationales de Paris	Nov. 25-Dec. 1	Paris, France	R. Ibos	14 Ave. Gabriel-Peri, Antony, Seine, France
Twelfth International Dental Congress	Sept. 7-14	Rome, Italy	P. Lalli Secy. Gen.	Via Boezio 16, Rome, Italy

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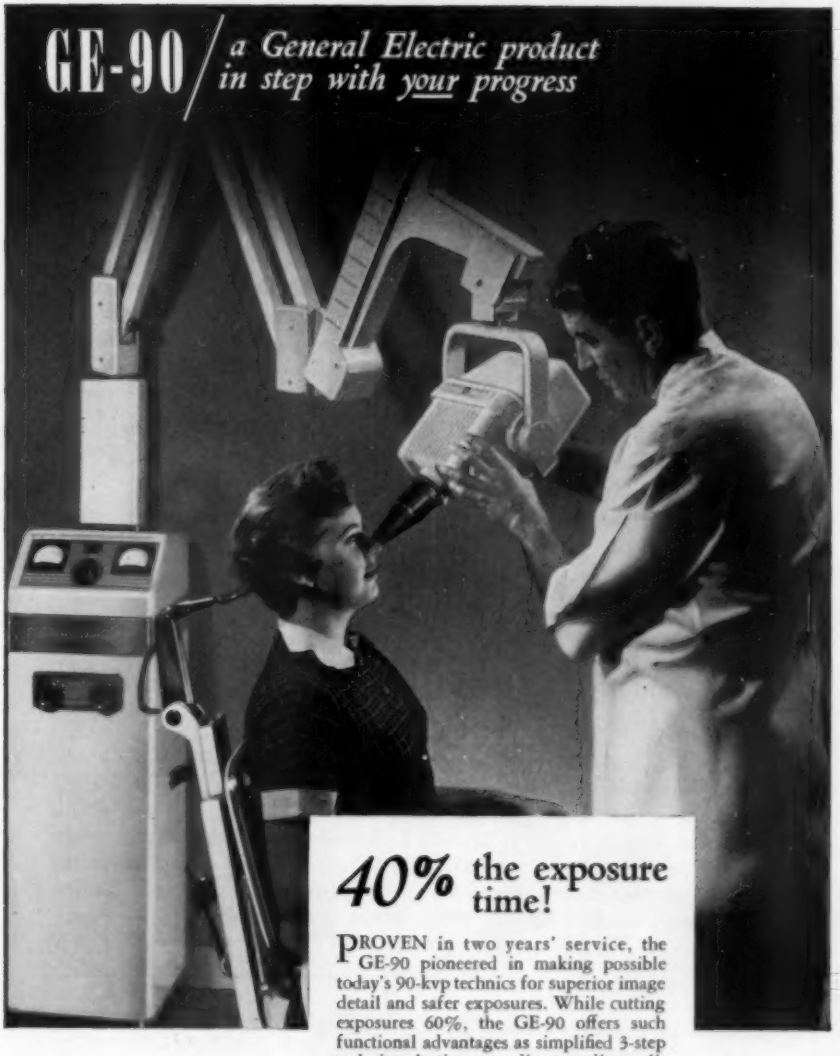

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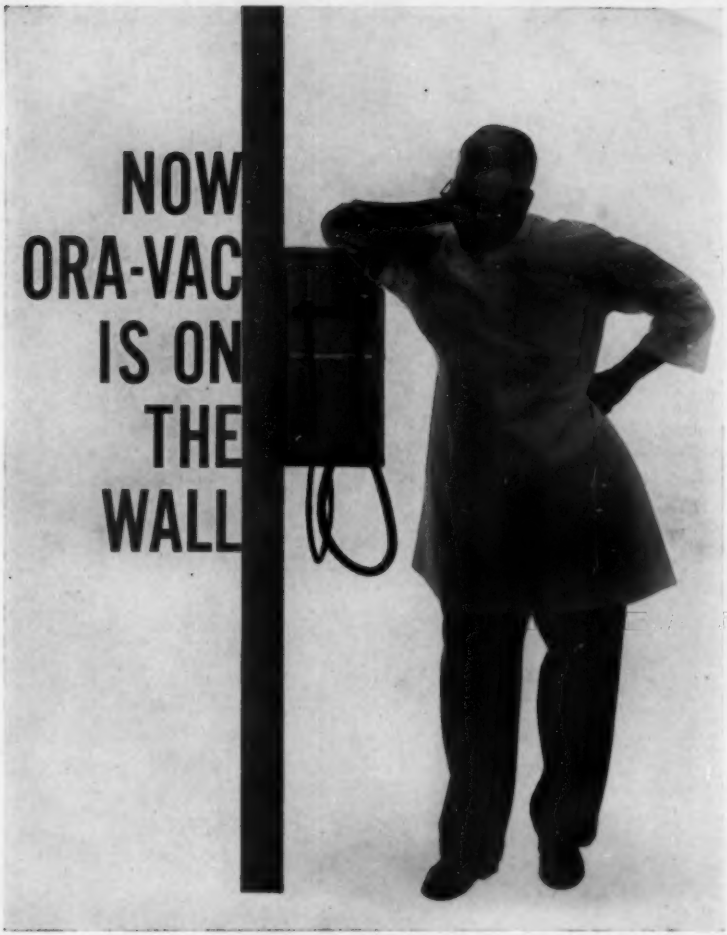

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98th Annual Session of the A.D.A.
Miami — Miami Beach, November 4-7, 1957

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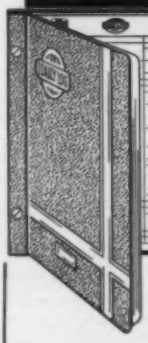

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DENTAL X-RAY NEWS

No. 9

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16" Distance	1/2	1/2	3/10	3/10	2/5	2/5	3/10	3/10

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Emergency Management of Acute Sensitivity Reactions—Merle M. Miller

Immediate Care of Maxillary and Facial Injuries—John H. Shackelford

Management of Shock—Brig. Gen. Sam F. Seeley, USA; and Col. Ogden M. Frank, USA

plus 7 other articles.

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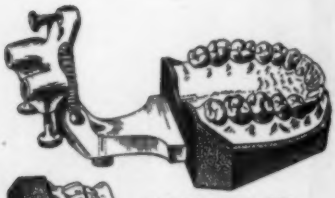

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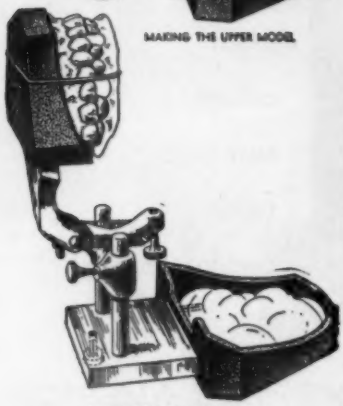

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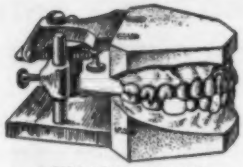

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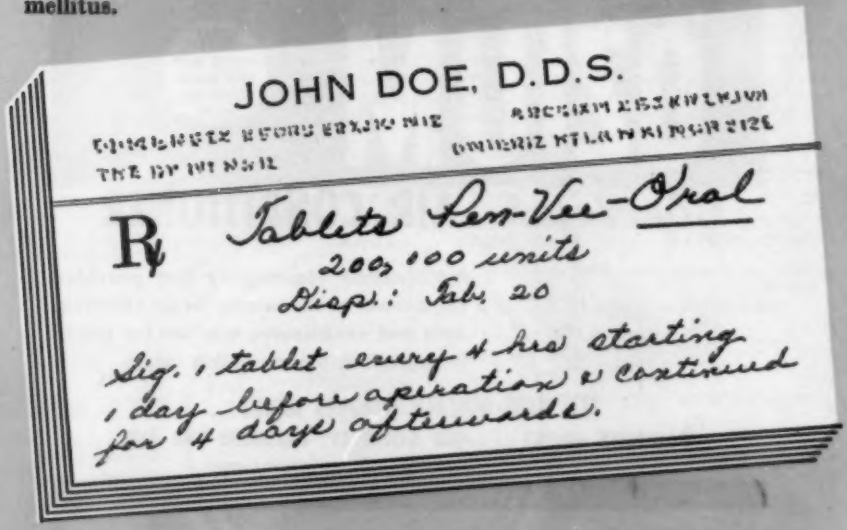
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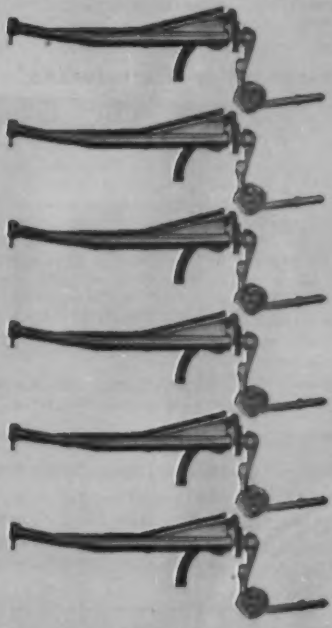

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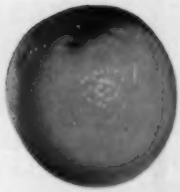

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1. King, C. G.: J. Am. Diet. A. 30:13, 1954.
2. Kelsten, L. B.: J. Dent. Med. 10:67, 1955.
3. Amer. Dent. Assoc.: Diet and Dental Health, Chicago, 1955, pp. 7-8.

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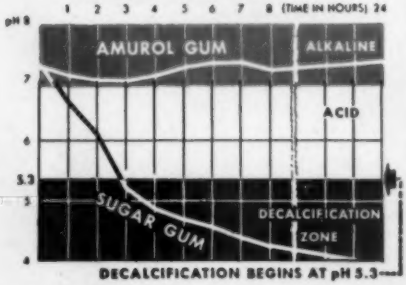

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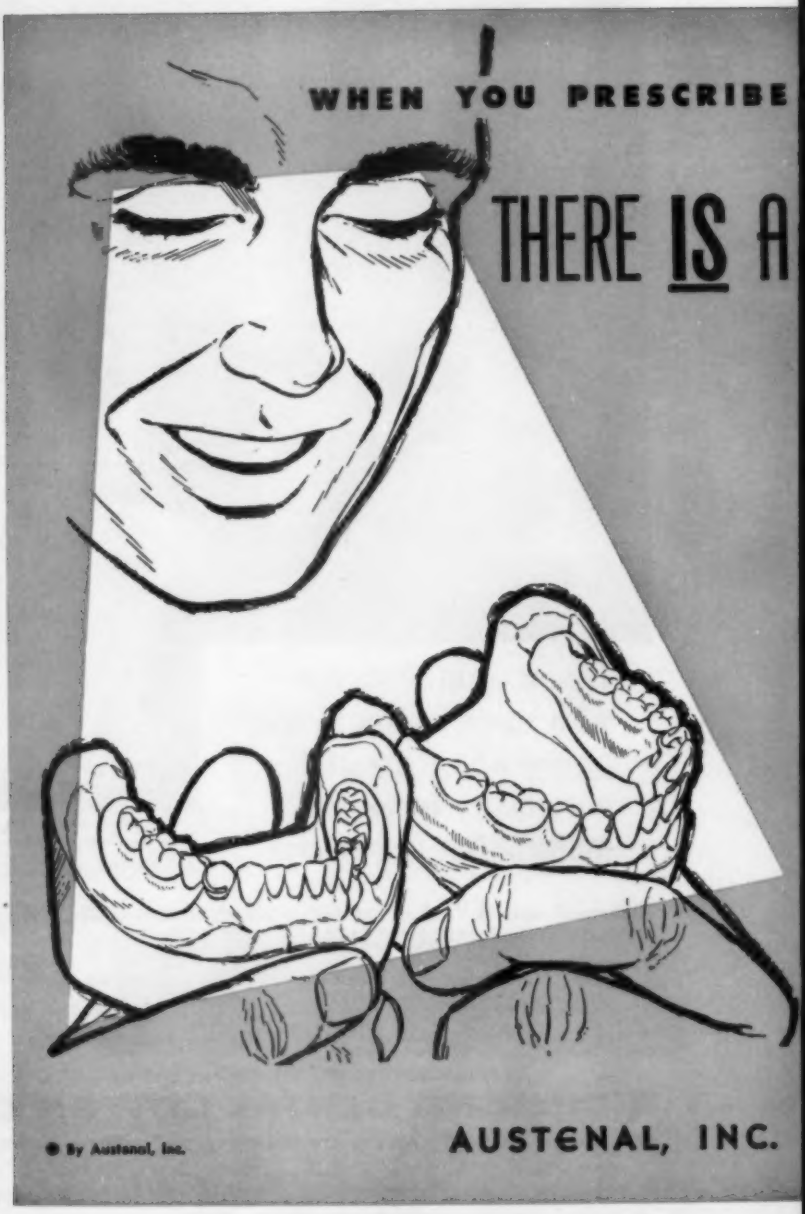
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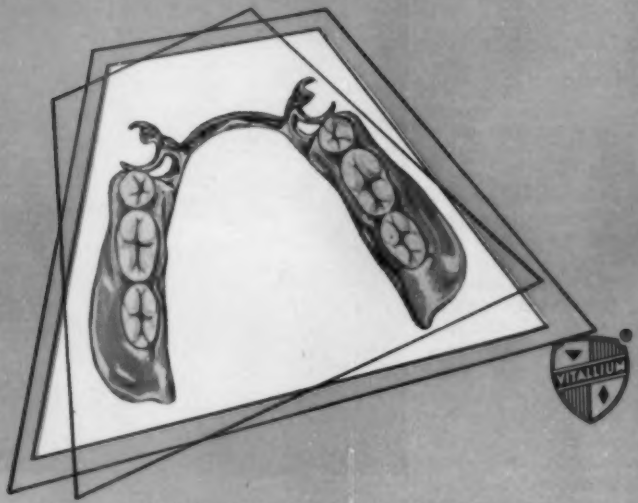

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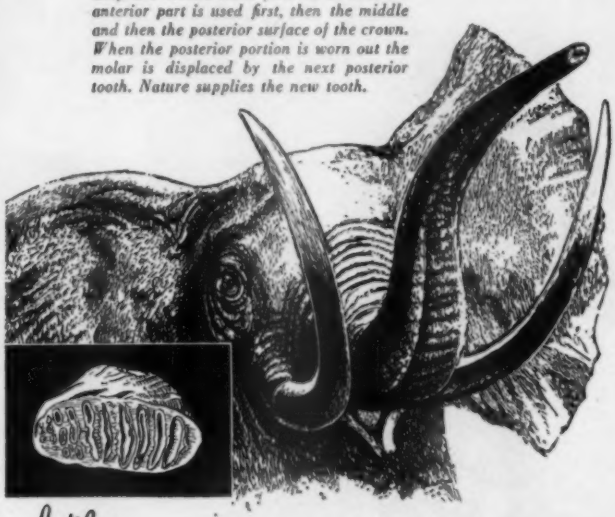

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Squibb 200,000 Unit Buffered Penicillin G Potassium Tablets

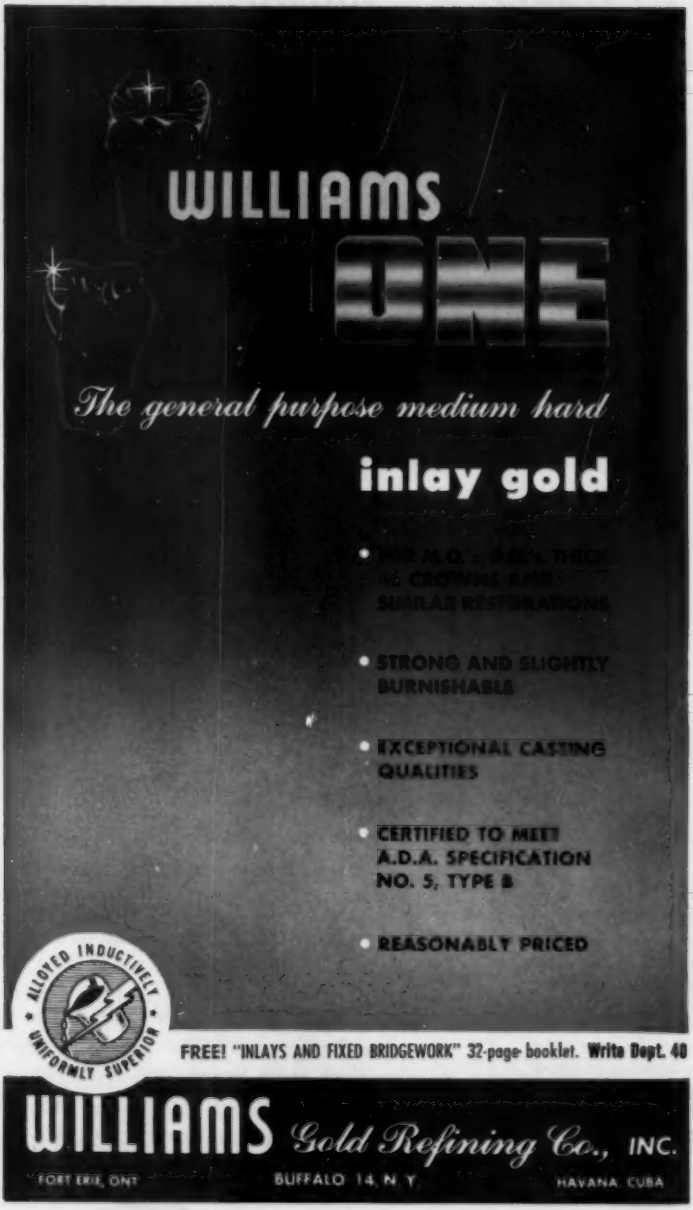
usual dosage:
1 or 2 Pentids Tablets three times daily without regard to meals

supply:
bottles of 12 and 100 tablets

Squibb (Natural Bristle) Angle Toothbrushes are still available in genuine Chungking bristles — 2 or 3 row, hard or medium, at all pharmacies.

SQUIBB **Squibb Quality— the Priceless Ingredient**

"PENTIDS" IS A SQUIBB TRADEMARK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A-62

No Protein Deterioration in Cooked Oatmeal

COOKED OATMEAL contains the same amount of good protein as is found in the original oat grain.

In the manufacture of rolled oats only the loose fibrous husk of the seed is removed. The germ fraction and outer seed covering of the grain, both containing protein of high biologic quality, are carefully preserved in the final flaked oats. This protein quality remains unaffected by cooking.

Comparative tests of the growth-promoting values of the protein of uncooked and cooked rolled oats for weanling albino rats show that cooking does not alter in any way the quantity or quality of the oat protein.[1]

In addition to providing the uncompromised protein of the oat grain—complemented by the protein of milk—the hot oatmeal-and-milk dish supplies a variety of vitamins and minerals important to daily nutrition, as well as readily available energy for the day's activities. A dish of hot oatmeal and milk is a dish of sound nutrition.

Quaker Oats and Mother's Oats, the two brands of oatmeal offered by The Quaker Oats Company, are identical. Both brands are available in the Quick (cooks in one minute) and the Old-Fashioned varieties which are of equal nutrient value.

1. Facts on Oats: Report by the Research Laboratories of The Quaker Oats Company, 1955.

DENTAL AUTHORITIES stress the importance of optimal nutrition in the aim toward better dental health during the early growth years. Oatmeal, with its wealth of essential nutrients, not only contributes broadly to good nutrition, but—since its carbohydrate is not readily degraded to simple fermentable sugars—is of virtually no cariogenic influence.

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- Protects against splitting force
- Restores contour and function of tooth

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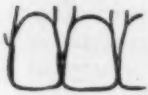
- Prevents periodontal disease



- Maintains better margins
- Preserves contact with adjacent tooth

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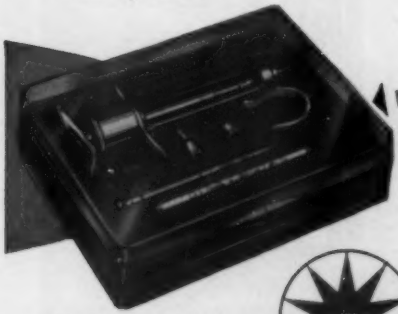

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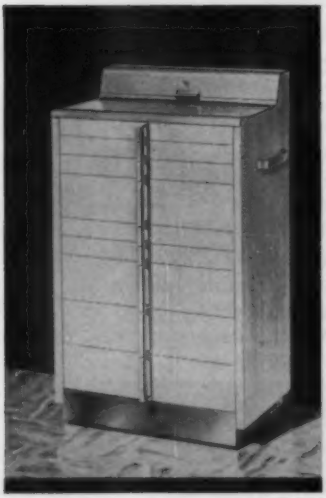

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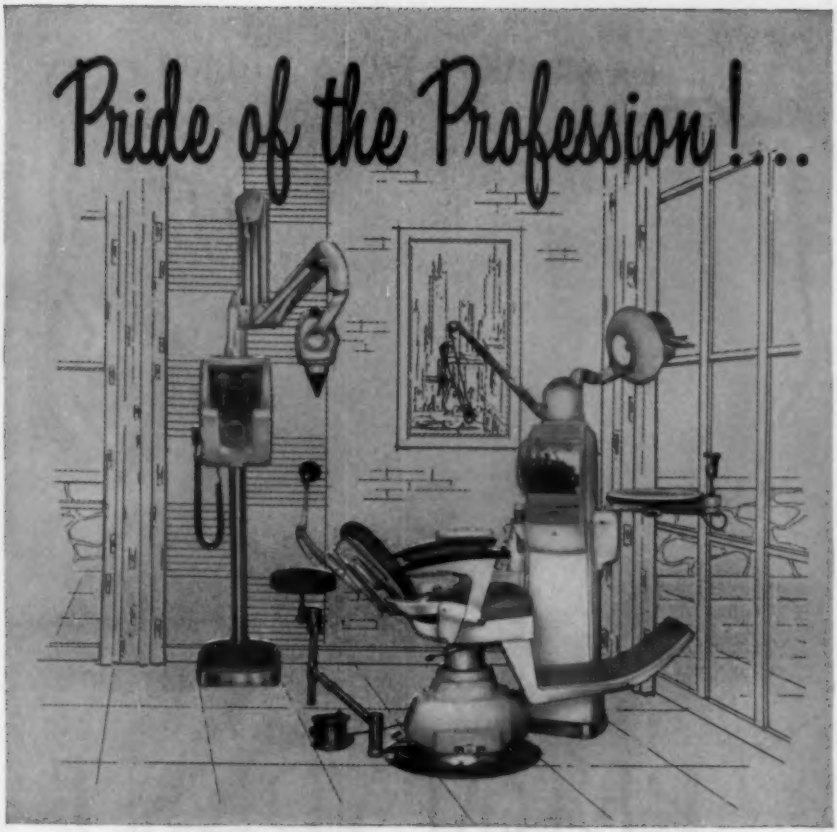

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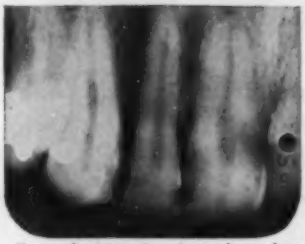

X-ray of patient in mirror above shows Mesial Class III in upper left cuspid, Mesial and Distal Class IIIs in upper left lateral, and Distal Class IIIs in upper left central.

In patients' mirrors . . . even in the eyes of their friends . . . Syntrex restorations are virtually imperceptible. For esthetic appearance, Syntrex is unexcelled. And Syntrex fillings, by reason of their durability, last indefinitely.

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ACHATITE COMPARES in CONCEPT and DESIGN TO THE REINFORCED CONCRETE OF ENGINEERING.

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ACHATITE affords High Compressive Strength
ACHATITE'S opacity is excellent
ACHATITE'S solubility is unusually low
ACHATITE'S influence on pulp is exceedingly small and can be easily eliminated completely.

CONCEIVED and DESIGNED BY PROF. KNAPPWOST in association with experimental Dentists of the University of TUBINGEN, GERMANY.

ACHATITE has gained wide acceptance in the United States by practicing DENTISTS who unreservedly hail it as the finest filling material for Anterior Teeth.

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- **IDEAL WHERE INCISAL EDGE STRENGTH IS NEEDED.**
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Fully equipped
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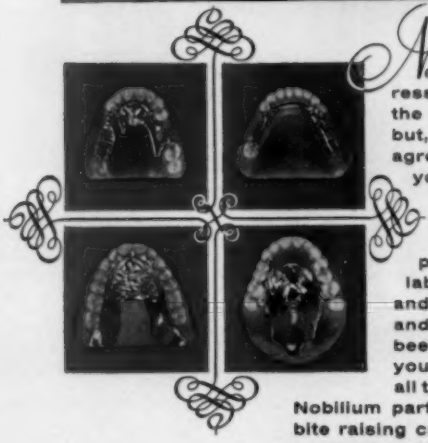

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XYLOCAINE OINTMENT

for better doctor-patient relationship

A D A

Hotel reservation application

98TH ANNUAL SESSION

AMERICAN DENTAL ASSOCIATION

NOVEMBER 4-7, 1957

MIAMI—MIAMI BEACH

FLORIDA

Reservations may be made for accommodations in hotels in three different sections of the Greater Miami Area; Miami, Miami Beach and Bal Harbour. The hotels in each section are listed in order of location reading from north to south, *e. g.*, top to bottom. The approximate time required to travel between the hotels and the Dinner Key Auditorium in Miami is indicated for each section. The scientific session and exhibits will be held in the Dinner Key Auditorium in Miami. The House of Delegates will meet in the Fontainebleau Hotel in Miami Beach.

All reservations for accommodations in any of the hotels listed may be made by completing this application and mailing it to the A.D.A. Housing Bureau, Box 1511, Miami Beach, Florida. Be sure to indicate your arrival and departure time. Reservations will be held until 6 p.m. of the day of arrival unless special arrangements are made with the hotel.

Names of all persons who intend to occupy the accommodations must be listed. List four choices of hotels. Confirmation will be sent to the applicant by the hotel which has accepted the reservation. Please write the A.D.A. Housing Bureau in Miami Beach if you wish to cancel the reservation.

A.D.A. HOUSING BUREAU • BOX 1511, MIAMI BEACH, FLORIDA

(Please print or type) A.D.A.

Applicant:

Name_____

_____

(Street address) (City) (Zone) (State)

Arriving_____ a.m. p.m. Leaving_____

Accommodations:

Hotel_____ Hotel_____

(First choice) (Third choice)

Hotel_____ Hotel_____

(Second choice) (Fourth choice)

☐ Single occupancy, rate to range from $_____ to $_____ per day.

☐ Double occupancy, double bed, rate to range from $_____ to $_____ per day. } 2 names must be listed below

☐ Double occupancy, twin beds, rate to range from $_____ to $_____ per day. }

☐ Suite of_____ rooms, including parlor, rate to range from $_____ to $_____ per day.

Occupants: (use an extra page for listing additional names if necessary)

Room will be occupied by:

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(Name) (Address) (City) (State)

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(Name) (Address) (City) (State)

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20 MINUTES TO DINNER KEY AUDITORIUM

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Miami Colonial	8.00	8.00-12.00
Everglades	6.00- 8.00	8.00-12.00
Biscayne Terrace	8.00	10.00-14.00
Alcazar	4.00- 5.00	6.00- 9.00
Key Biscayne	10.00-14.00	10.00-14.00

MIAMI BEACH HOTELS

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San Juan	14.00	14.00-20.00
Fontainebleau		12.00-20.00
Sorrento	8.00	10.00-14.00
Saxony	7.00	8.00
Empress	10.00	12.00-14.00
Vendome	6.00	8.00-10.00
International		7.00
San Marino	10.00	12.00
Lucerne	10.00-12.00	12.00-14.00
New Cadillac	10.00-12.00	12.00-14.00
Continental	5.00- 6.00	6.00- 7.00
President Madison	9.00	11.00
Caribbean	8.00	8.00-12.00
Shoremede	8.00	10.00
Saxony	8.00	10.00-16.00
Sea Isle	10.00-12.00	12.00-16.00
Seville		10.00-16.00
Algiers	10.00	12.00-14.00
Surfside Plaza		6.00-10.00
Roney Plaza	8.00-12.00	10.00-16.00
Sea Gull	8.00	8.00
Pickwick	8.00-12.00	10.00-14.00
Shore Club	8.00	10.00
Shelborne	10.00	12.00
Dotano	10.00	10.00
di Lido	10.00	10.00-16.00

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Ivanhoe	8.00-12.00	10.00-16.00
Balmoral	10.00-14.00	12.00-18.00
Americana		14.00-20.00

A-82

The Contribution of *Enriched Bread* to Childhood Nutrition

"Children reared on nutritionally adequate diets have many advantages over those reared on poor diets. These advantages include: better growth and development; greater strength and vigor; and more evidence of good general nutrition."[1] The nutritional status of millions of American school children has been enhanced significantly by enriched bread during the past fifteen years, and for these reasons:

Enriched bread contains thiamine, riboflavin, niacin, calcium, iron, and protein. All have made important contributions to the reduction of deficiency diseases traced to the lack of these nutrients. Many authorities cite the virtual elimination of deficiency diseases in recent years as impressive evidence of the role enriched bread has played.[2]

Enriched bread, containing added nonfat dry milk, provides a highly nutritive protein combination derived from three sources —flour, milk and yeast—with milk and yeast proteins supplementing the flour protein. These proteins not only contribute to the maintenance and repair of children's tissues, but also to good growth.

Dental authorities agree that a good diet is an important factor in dental health. The complex carbohydrates present in bread—in contrast to the action of simple carbohydrates—do not readily diffuse into dental plaques and therefore are of low cariogenic activity.[3]

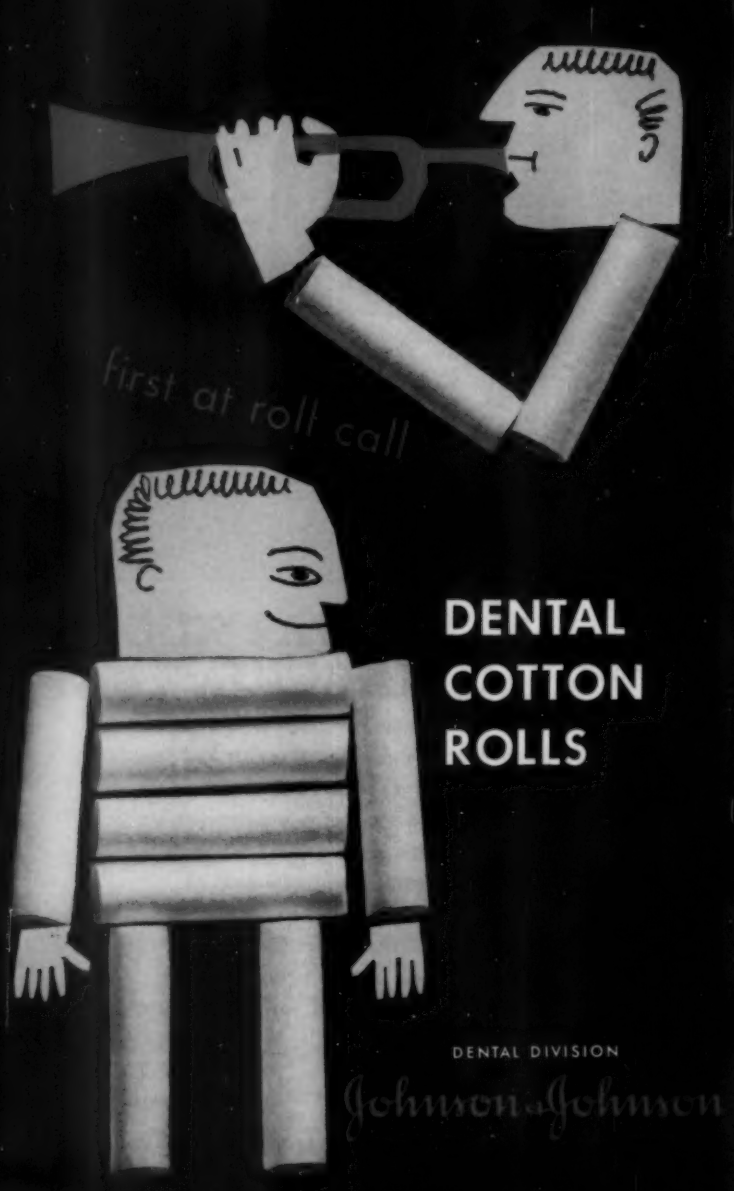
These are some of the reasons why the role of enriched bread, in improving the health of millions of American school children, has been referred to as one of the most important advancements in public health measures since compulsory pasteurization of milk.

1. Martin, E.A.: Roberts' Nutrition Work with Children, Chicago, University of Chicago Press, 1954, p. 53.
2. Sebrell, W.H.: Developing Modern Nutrition Programs, Public Health Reports, United States Department of Health, Education and Welfare 69:277 (Mar.) 1954.
3. Joint Report of the Council on Dental Health and the Council on Dental Therapeutics of the American Dental Association: Sugar and Dental Caries: The Effect on the Teeth of Sweetened Beverages and Other Sugar-Containing Substances, J. Am. Dent. A. 47:387 (Oct.) 1953.

AMERICAN BAKERS ASSOCIATION

20 NORTH WACKER DRIVE • CHICAGO 6, ILLINOIS

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.



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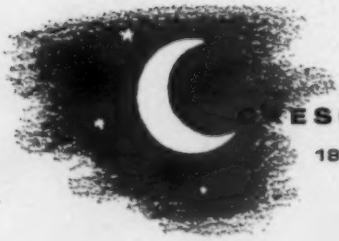
Silverloy, as its name implies, has a whiteness that is silvery and lustrous. It has been a delight to the eye as dentists have kept telling us for more than half a century! It amalgamates smoothly and readily to a velvety consistency, carves easily, delivers an excellent edge strength, strong lasting margins and dependable resistance to occlusal stress. This is the naked truth as millions of successful fillings bear witness and thousands of your fellow dentists will be glad to corroborate from their personal experience. Available in Filings, Shavings, or #20 Cut for use in proportioners.

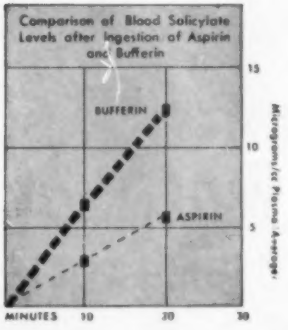
Only $2.00 per oz., 5 ozs. for $9.75 at your dealer's.



CRESCENT DENTAL MFG. CO.

1839 South Pulaski Road, Chicago 23, Illinois

GIVE YOUR PATIENT FASTER PAIN RELIEF with BUFFERIN®



Relieve the pain attending dental treatment—whether extraction or cavity preparation—by recommending BUFFERIN. This antacid analgesic acts twice as fast as aspirin. In ten minutes after taking BUFFERIN the blood salicylate levels are higher than those attained with aspirin in twice the time.

Gastric distress is almost unknown when BUFFERIN is taken, even in large doses, for BUFFERIN is antacid.

Your patients will appreciate BUFFERIN's prompt antacid analgesic action.

BUFFERIN contains no sodium.

BUFFERIN®

Acts Twice as Fast as Aspirin
Does Not Upset the Stomach

Accepted
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EACH BUFFERIN TABLET contains 5 grains of acetylsalicylic acid, together with optimum amounts of the antacids aluminum glycinate and magnesium carbonate.

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